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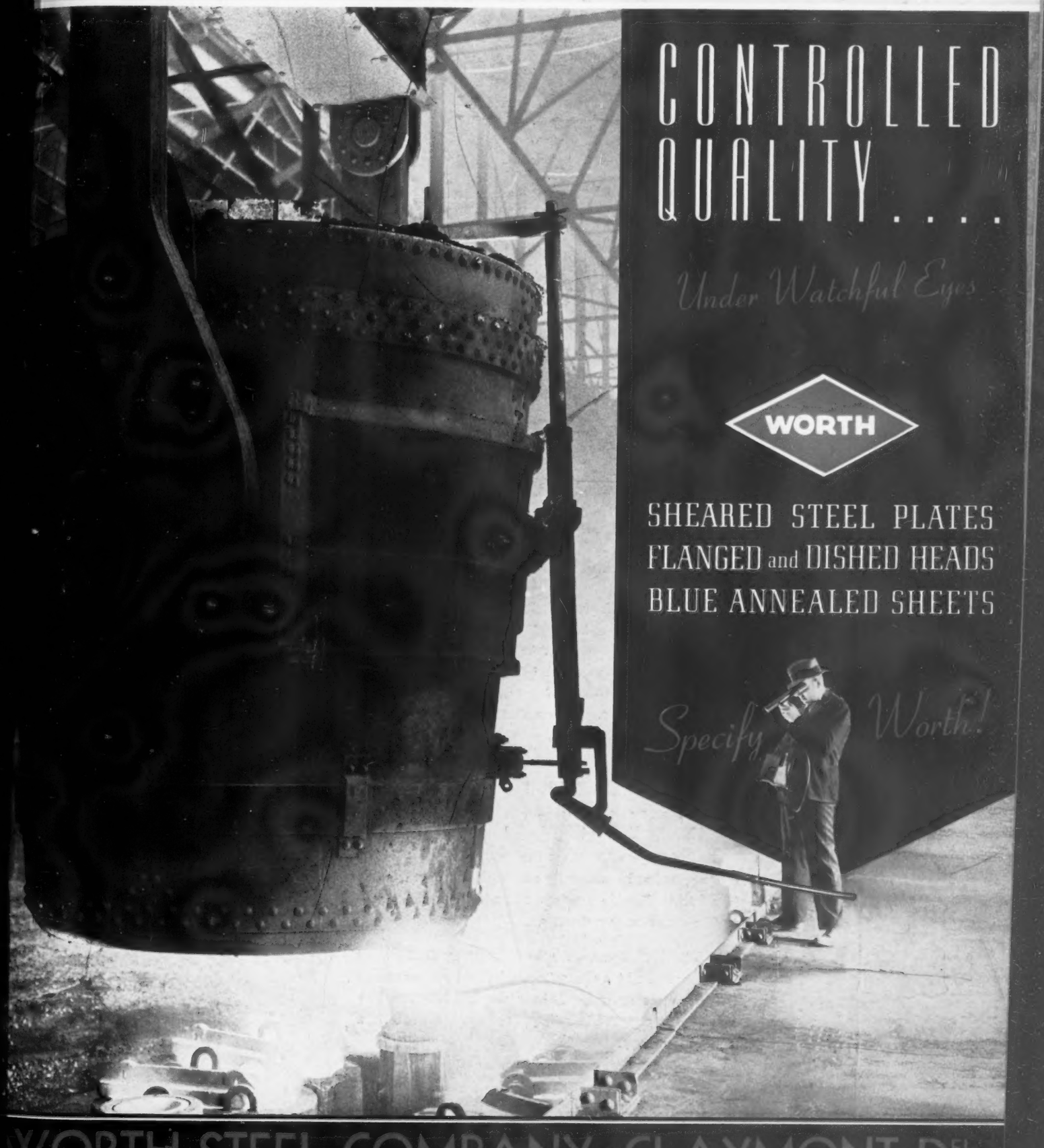
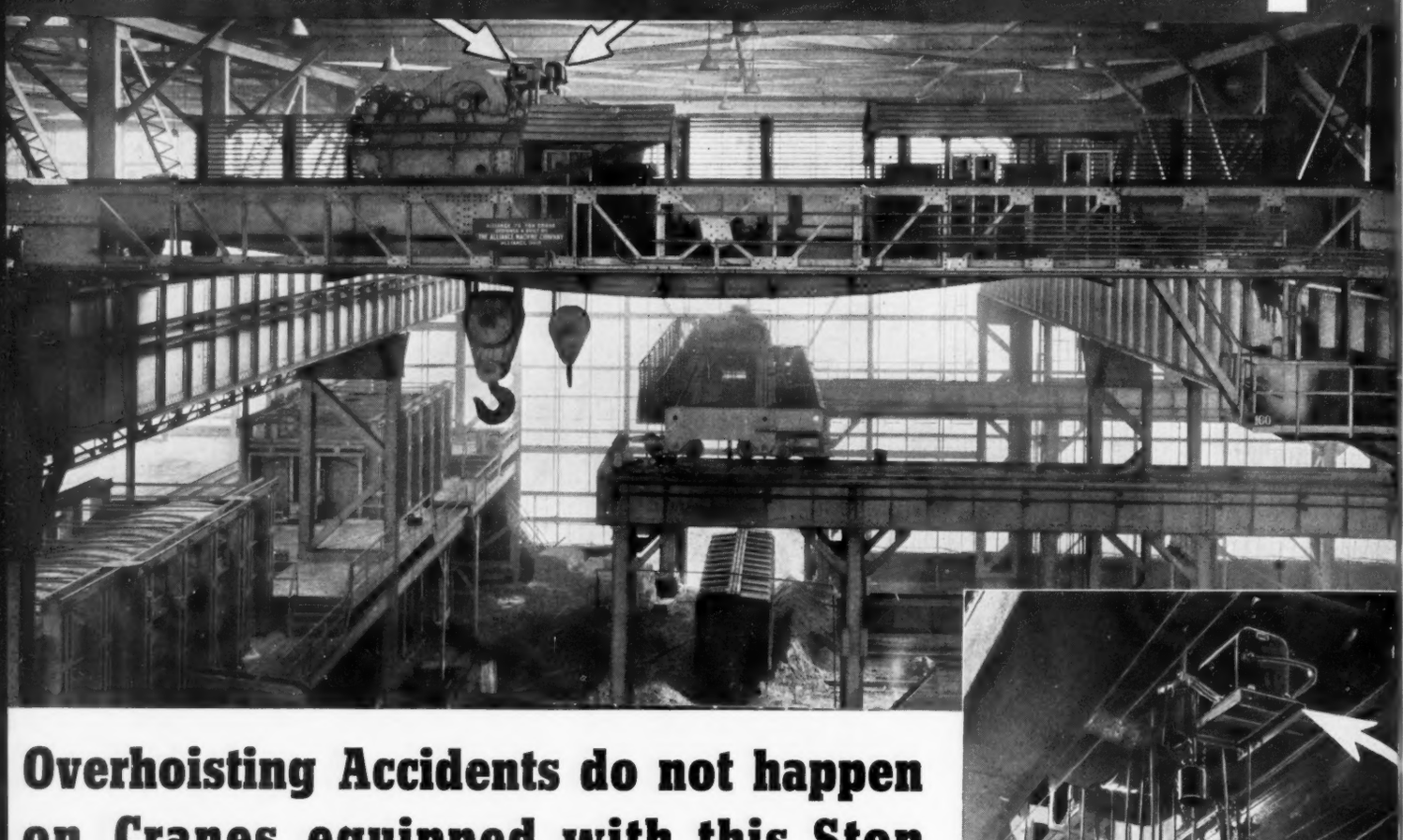
STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW



YOUNGSTOWN
Crane Limit Stops



Overhoisting Accidents do not happen on Cranes equipped with this Stop

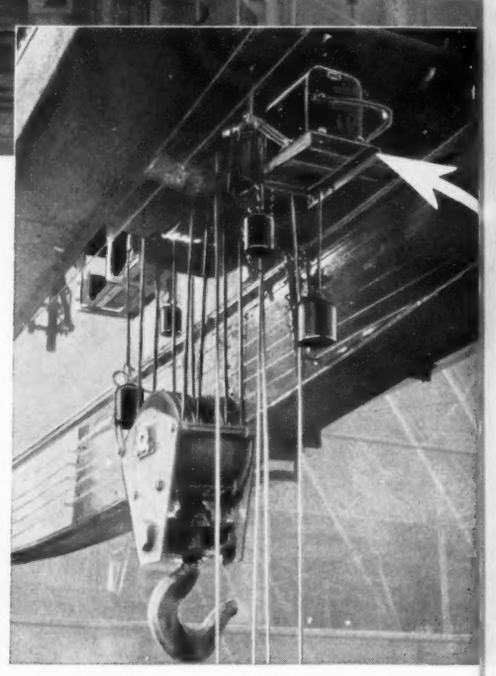
e Nos. 2 and 3 Youngstown Limit Stops built with two weights and the No. 1 for small cranes is equipped with but weight. Duplex Stops for use with notor hoists to stop both motors simul-neously are supplied for ladle, hot metal, cket and similar duplex-hoist cranes.

Every Crane needs this Limit Stop, because, like the safety valve on a boiler, it is the final protection against loss of life and property damage. Operated directly by the hook block, the Youngstown Limit Stop not only disconnects the motor from the line but brings it to a quick stop by dynamic braking on direct current cranes and by plugging on alternating current cranes.

Remove the fear from an operator's mind —then he'll do better work!

Overhoisting accidents are the mental hazard of every crane operator, because only one mental lapse may result in a fatality. Provide your operator with dependable protection against such a disaster.

Bulletin 1035-B describes the Youngstown Safety Limit Stop for use on both alternating and direct current cranes and illustrates many installations showing how this Stop may be easily applied to both types of new and old cranes. Write for a copy.



The above illustration shows one method of mounting two No. 2 Youngstown Safety Limit Stops under the crane trolley. Many other methods are illustrated in Bulletin 1035-B.

THE ELECTRIC CONTROLLER & MFG. CO. CLEVELAND, OHIO

When buying Cranes Specify **E.C.&M** *Control*

Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Co-ordination Is Needed

To the Editor:

I shall give you a little history that may be interesting in view of the change in the New York building code. (STEEL, Feb. 28, p. 19.)

About 1921 I erected the first "steel lumber" joists in New York territory. The bureau of buildings would approve them only for nonfireproof buildings. I looked up the building law and found that the tenement house department had complete authority over the building of tenements and consequently the bureau of buildings had no power to approve or disapprove a construction. I gave this information to the then superintendent of buildings, Rudolph P. Miller, and he told me to see the tenement house commissioner, Col. Mann. I did so, with the result that Col. Mann approved light steel joists with a 1-inch cement plaster ceiling underneath as fireproof construction in the city of New York for tenement houses. He wrote this to Mr. Miller and Mr. Miller called a meeting of the borough superintendents and gave them written memoranda regarding Col. Mann's decision.

I do not know that any building was erected in New York city taking advantage of this construction. I worked out the difference in cost of various constructions and gave them to some of our best architects and builders but they were not interested. The light joists showed a considerable saving.

It is my impression that they were not used because, in general, building is not an integrated industry. It requires capital, an architect, a builder with subcontractors, labor, a city building department, and sales.

There are so few cases where all the functions of building are performed by one company, working to produce the best building at the most reasonable price. Even where this is the case, the builder feels that he cannot change any construction until it is forced on him by the government, by purchasers or by a well established material sales organization.

T. J. FOSTER

Ridgewood, N. J.

Makes a Point Clear

To the Editor:

I notice an item on page 66 of your March 21 issue describing the talk given by L. J. St. Clair, of our company, before the Bristol, Conn., chapter of the Society of Tool Engineers.

In the last two lines of the article is mentioned the fact that "carbon tetrachloride was recommended as the best agent in brazing." This statement, as it appears, is somewhat misleading. Carbon tetrachloride is used to clean the shanks and the Carboloy tips before brazing is started. In other words, carbon tetrachloride is the cleaning agent rather than the actual medium used for brazing. Our booklet T-37 describes the brazing procedure.

E. C. HOWELL

Advertising Manager,
Carboloy Co. Inc.,
Detroit.

"Our Money Comes Back"

To the Editor:

I read with interest the letter on pig iron imports by "Eastern Merchant Pig Iron Producer" (March 21, p. 11). It repeats old errors which wise businessmen dare not entertain. The truth may not be wholly pleasing, but it is much safer. This truth has two sides, only one of which was given consideration.

It seems we spent some money abroad for pig iron to the amount of over 100,000 tons, an amount not so very large. In so doing our people were able to contribute an extra $250,000 to taxes and save themselves about $100,000. So far no argument. It *may* be true that a considerable number of people were thereby displaced from pig iron production, but I strongly doubt it. The writer assumed implicitly that such people were displaced.

Having spent some money abroad, foreigners had money to the amount of, say, $1,650,000, received from us. This money is not buried. It gives these foreigners the wherewithal with which to buy goods of us. If the sellers do not use it, some one else will acquire the exchange and will use it to buy goods of us.

In the normal course of events, foreigners will buy of us about $1,650,000 worth of our goods. Our people at home, who saved $100,000 on pig iron purchases, will have $100,000 with which to buy goods at home they might not otherwise have bought. In addition, taxing of the pig iron by tariffs reduces the amount that will be raised by taxes in some other way, leaving an extra $250,000 to be applied at home. The net effect of importing pig iron, so far as the money spent in this country is concerned, is just the same as if nothing were bought abroad and all of the $2,000,000 was spent at home. The effect in goods is, of course, somewhat different. We not only enjoyed 100,000 tons of pig iron, but also other things we should not have had the money to buy. The extra made available to us for other goods was $350,000 and measures our gain in enjoyment of goods we could not otherwise have enjoyed.

If the same amount of money is

(*Please turn to Page* 101)

THERE is a good practical reason why responsible manufacturers choose B & L Ground Shafting . . . because, it ***does things*** for their machines . . . definitely improving the running qualities and increasing service life.

If you are designing or building equipment to insure balanced operation at high speed . . . with minimum wear on bearings and freedom from destructive vibration . . . you need the extreme accuracy and uniform quality that go with B & L Steel Shafting.

You will find that this prime product is the best insurance against wear and depreciation in precision mechanisms. Let B & L engineers advise you on your special shafting problems.

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STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

Contents

Vol. 102-No. 14 **April 4, 1938**

READER COMMENTS 19
AS THE EDITOR VIEWS THE NEWS 23
NEWS
- Oil, Gas Promise Sustained Demand for Steel 25
- 4200-Foot Chain for Sea Plow 26
- March Pig Iron Production Up 2.5 Per Cent 27
- Keep Up Letters, General Johnson Advises 28
- Managers "Plan for Stability" 28
- Stettinius Heads U. S. Steel; Taylor Says Farewell 29
- February Imports Lowest Since 1935 29
- Men of Industry 30
- Obituaries 31
- Tool Society's Chapters Elect Officers 32
- Financial News of the Steel Industry 33
- Steelworks Operations for the Week 33

MIRRORS OF MOTORDOM 35
WINDOWS OF WASHINGTON 39
EDITORIAL—Broader Research in Alloys of Iron Has Firm Foundation in Work Already Done 41
THE BUSINESS TREND
- Index of Industrial Activity Shows Seasonal Gain 42
- Charts and Statistics 42-43

TECHNICAL
- Accuracy in Large Roller Bearings 44
- Western Metal Congress in Los Angeles 48
- Welded Oil Well Casing 58

MATERIALS HANDLING
- Floor-Space Economy 55

PROGRESS IN STEELMAKING
- Roll Heating 64

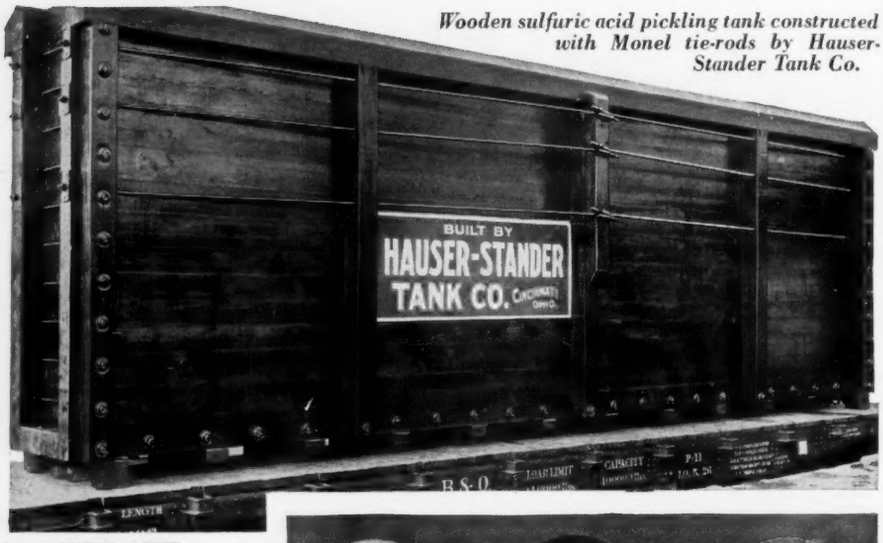
NEW METAL PRODUCTS 68
HEAT TREATING
- Novel Spring Heaters 71

INDUSTRIAL EQUIPMENT 74
MARKET REPORTS AND PRICES 81
- The Market Week 82

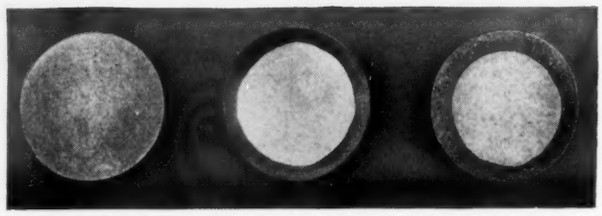
BEHIND THE SCENES 90
CONSTRUCTION AND ENTERPRISE 101
INDEX TO ADVERTISERS 126

PRODUCTION • PROCESSING • DISTRIBUTION • USE

TANKS *stay* TIGHTER, LONGER.. *with* TOUGH MONEL TIE-RODS



Wooden sulfuric acid pickling tank constructed with Monel tie-rods by Hauser-Stander Tank Co.



Cross-sectional view of test rods after a year's service holding together wood timbers exposed to pickling acid at one of the country's leading steel sheet mills. Note that Monel (left) is uniform across its whole diameter. Monel is not susceptible to the peculiar form of corrosion that alters metal structure and impairs strength and without showing signs of disintegration that are plainly visible by inspection of the surface.

Pickling tank manufacturers know that this enduring metal retains its strength despite corrosive attack

Take a look at the stout wooden pickling tanks shown on this page. Though built by *four* different manufacturers, only *one* metal is used for the tie-rods. And that is Monel.* The reason? Simply this:

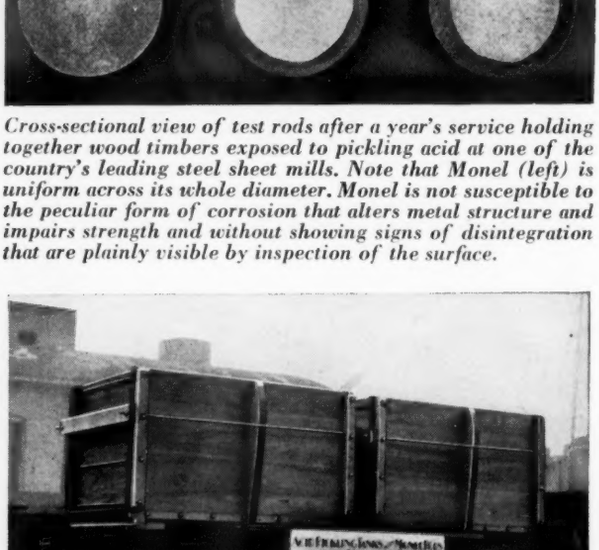
Manufacturers of pickling tanks know Monel. Their old customers specify it and to their new customers they recommend it. They know that this metal is strong and tough . . . they can tighten up *plenty* on tie-rods of Monel. They know, too, that Monel *holds* its strength for many years, that it resists pickling acid corrosion. So wooden pickling tanks when equipped with Monel tie-rods stay tight longer. Repairs and replacements are thereby reduced, and leakage is prevented.

When designing or ordering pickling equipment, remember it will stand up longer, cost less in repairs, if made of Monel. Write for further information about this enduring metal. Ask for "Equipment Designs for the Pickle House", and "A Good Start to a Better Finish".

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET NEW YORK, N. Y.

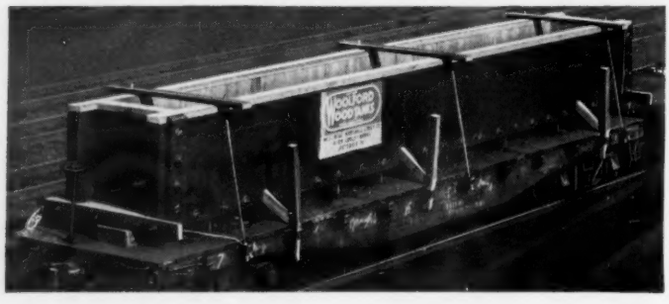
*Monel is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. This alloy is mined, smelted, refined, rolled and marketed solely by International Nickel.

INCO NICKEL



Wood pickling tanks with Monel tie-rods fabricated by Kalamazoo Tank & Silo Company, Kalamazoo, Mich.

(Below) Wooden pickling tank with Monel tie-rods fabricated by the G. Woolford Wood Tank Mfg. Co., Philadelphia., Pa.



Two wood pickling tanks with Monel tie-rods for a large steel corporation. Tanks manufactured by the Challenge Company, Batavia, Illinois.

As the Editor Views the News

■ STEEL'S survey of prospects for petroleum (p. 25) indicates this industry will be fully as large a buyer of steel and metal products this year as last. Despite harassing government restrictions, burdensome taxes, overproduction and other problems, drilling and pumping will continue active. While consumption of fuel oil for industrial use has declined, that of gasoline, the "depression-proof" commodity, is increasing. . . . A dramatic event is slated for today. At the annual stockholders' meeting Myron C. Taylor (p. 29) will give final account of his 10-year stewardship of the United States Steel Corp. Tomorrow, at the directors' meeting, E. R. Stettinius Jr. is to be elected his successor as chairman of the board, fourth in the line that started with the late Judge Elbert H. Gary in 1901.

• • •

When the finance committee of the senate reports the new tax bill back to that body this week it will be stripped of the tax on undistributed profits, and the capital gains tax will be replaced by a flat tax of 15 per cent. These modifications will be beneficial but fears generated by the rapidly rising tax bill continue to mount. This year's tax burden (p. 39) is at least one-fifth of the national income, a dangerous situation. The mounting tax burden has contributed importantly to the present slump in business. . . . The rate of steel production (p. 33) advanced another point last week, to 36 per cent of ingot capacity, due to a better miscellaneous demand. . . . February imports (p. 29) were the lowest for any month since 1935. . . . The pig iron production rate (p. 27) is up slightly.

Taxes Fifth Of Income

• • •

Failure of automobile production to register its normal spring improvement is a factor in the labor situation at Detroit (p. 35) which again is taking a turn for the worse. Making additional demands, the United Automobile Workers refused to renew the agreement with Chrysler Corp., which expired last Thursday. . . . No early improvement in automobile production is expected but the industry looks for a good year in 1939. . . . A forged chain 4200 feet long (p. 26) will be used to drag a 10-ton cast and forged steel plow along the bottom of the Atlantic ocean to make a furrow in which will be laid cables connecting the Irish coast and the United States. Purpose is protection of the cables from damage by fishing trawlers. The chain is of 3.5 per cent nickel steel having tensile strength of 125,000 pounds per square inch.

More Labor Difficulties

• • •

Measurement of accuracy has become increasingly important in recent years. To control accuracy of large roller bearings for continuous strip mills one manufacturer (p. 44) bases measurements on a machine which measures directly up to 80 inches in increments of 0.00001-inch. For angles a special sine bar which measures within 12 seconds is used. All measurements are standardized at 68 degrees Fahr. . . . A new high-strength, flat-rolled steel (p. 78) has been placed on the market. It has high impact and fatigue resistance and unusual resistance to corrosion. . . . Traveling conveyors and automatically controlled gas-fired furnaces (p. 71) feature a new plant devoted to heat treating coil springs. All controls are in one room where they are under the direct supervision of the chief metallurgist.

Extremely Accurate

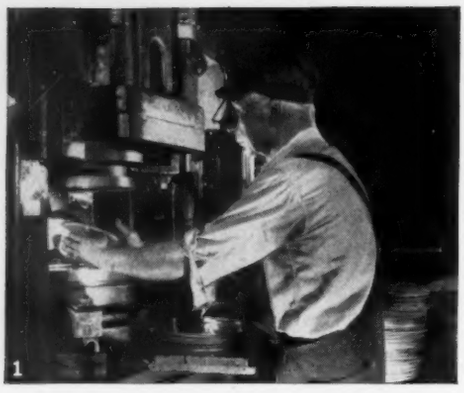
• • •

An overhead trolley conveyor in a refrigerator plant where floor space is at a premium (p. 55) has vertical dips and unusually short vertical and horizontal radii curves. An attachment link with double swivel-chain connection was designed specially for this installation. . . . Welding of oil well casing strings and of light-gage metals (p. 58) were among the important subjects discussed at the American Welding society's western regional conference at Los Angeles, March 21-25. An exceptional range of discussion featured the sessions held simultaneously by the American Society for Metals. . . . Sheet mill rolls, shown starting up or when changing rolls, are being heated economically (p. 64) by a new gas-fired roll heater. Two new malleable guard rail posts for highways (p. 68) have been developed.

Metals Discussed

E. L. Shaner

Solving the Problem of Quality Contro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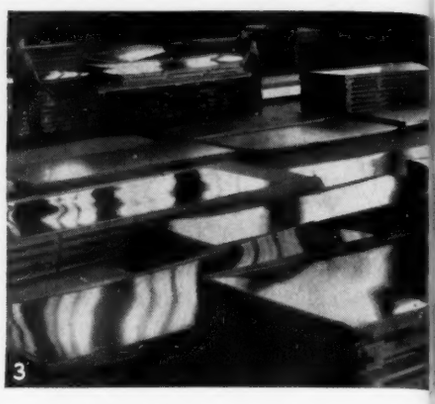
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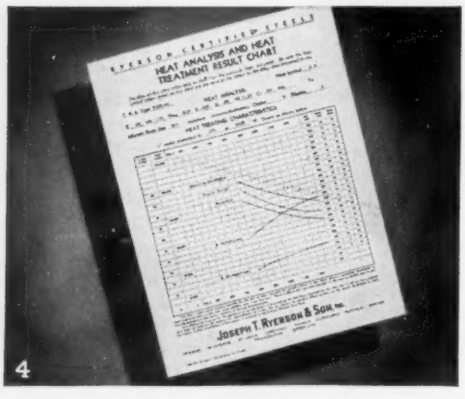
Automatic operation and increasing production speeds emphasize the need for greater uniformity and higher quality in steels. Realizing the situation, Ryerson began work on this problem several years ago. Specifications were tightened, and inspections made more rigid in order to assure uniformity and working qualities most desired in each classification of steel. The task was slow but we gradually built up stocks of these better steels. Today we can definitely certify to the known high quality an uniformity of all steel in stock fro the smallest bar to the large beam. The most modern war housing facilities and handlin methods protect and preserve thes qualities and assure quickest pos sible shipment.

Unique Alloy Steel Plan Aids Steel Treater



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To secure uniform high quality alloys, Ryerson selects entire heats of steel. The chemical analysis, grain size and cleanliness rating of these heats come within a certain narrow range that assures the most uniform and favorable response to heat treatment. All bars from each heat are marked with identifying letters. Bars from each heat are then actually heat treated to determine their response to heat treatment. Special data sheets are prepared showing the chemical and physical properties, grain size, cleanliness rating and hardening characteristics.

We send this complete data with every order of alloy steel. The heat treater knows the properties and characteristics of the alloy wit which he is working. He does no have to guess or test. He gets bette results in less time. Spoilage an re-treating are eliminated.

There are many other advantage for users of Ryerson Certified Steels Let us send you booklet P8 whic tells the complete story.

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WRITE FOR 28-PAGE BOOK ON RYERSON CERTIFIED STEELS

Oil and Gas Industry Promises Sustained Demand for Steel This Year

■ STEADILY increasing demand for gasoline and other petroleum products has given the oil and gas industry remarkable stability. Less affected by business cycles than almost any other product, gasoline often is referred to as a "depression-proof" commodity.

This stability presages sustained demand for steel products by oil and gas producers and distributors.

In the last depression domestic gasoline consumption continued to expand in 1930 and 1931, then dropped only slightly in 1932 before resuming an upward trend. With the exception of this one year, demand advanced steadily during the past 20 years.

This trend is expected to continue in 1938, an increase of 5 per cent over 1937 being forecast in the industry. January consumption exceeded that of the same month last year by 4.4 per cent.

Demand for other petroleum products, especially fuel oil, has shown far greater fluctuation, and the immediate outlook is not as promising as that for gasoline. The recession has reduced orders from railroads, power plants, many industries, and the marine fields. Consumption of fuel oil in the steel and metalworking industries is more than 50 per cent below that of a year ago.

Overproduction Is Problem

In January demand for light fuel oil was 15 per cent under January, 1937, heavy fuel oil demand was 11 per cent lower. Part of this may be attributed to mild weather and consequent less consumption in residential oil burners.

To meet this situation—increased gasoline demand and lower fuel oil consumption — the industry has raised the ratio of gasoline produced from crude oil.

Despite its comparative stability, however, the petroleum industry has its problems. In common with others, it is harassed by government restrictions, burdensome taxes and other impediments. Another bothersome problem currently is overproduction and large accumulated stocks, a difficulty the industry now is striving to correct.

Notwithstanding, drilling and refinery operations are active and promise to continue so.

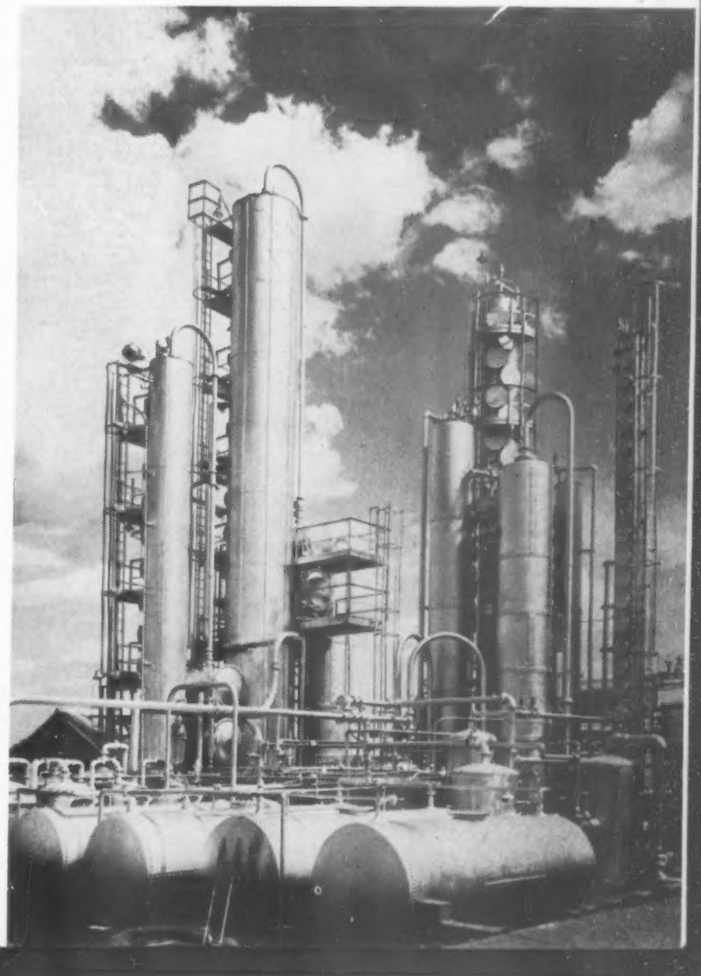
The paradox of increased gasoline consumption in view of decreased automobile production and the general business recession is explained thus: Total automobile registrations do not necessarily decrease as new car production drops; older automobiles require more fuel than newer vehicles; lower incomes to automobile drivers in industrial areas is offset by increased gasoline buying in rural areas.

Oil well drilling will continue active. Total wells drilled in the United States this year to March 26 were 5919, only 40 less than in the comparable period last year. The number of drilling permits issued declined from 5983 to 5120, off 14 per cent. Drilling in 1937 was at about a record level with more than 32,000 wells.

Forecasts based on surveys of prospective operations, supplemented by questionnaires to leading oil companies, indicate drilling and pumping expenditures for 1938 will approximate $750,000,000. This contemplates drilling about 100,000,000 feet, and equipping between 13,000 and 15,000 wells for pumping.

Refinery building and improvement is active with $100,000,000 of construction under way and more projected. Obsolescence and deterioration of refining equipment is rapid and necessitates frequent replacement. Serious corrosion of refining facilities often makes rebuilding of such units mandatory in about three to five years.

The corrosive action of petroleum products rapidly deteriorates metals commonly used. While stainless steel has been adapted for parts of



■ **Vapor recovery plant in Continental Oil Co.'s Ponca City, Okla., refinery recovers light products to make more volatile motor fuels. Refinery construction is expected to continue active for several years, will require considerable steel**

—Photo courtesy Nat. Petroleum News

refining equipment its cost is said to limit its general use.

Welding has been adopted to a considerable extent in refinery equipment pipe joints. This permits cutting out corroded sections and more rapid replacements.

More refinery construction would be released by a return of business confidence, oil company spokesmen say. Confronted by the same fear that permeates all business, some construction has been postponed or suspended pending clarification of tax and other governmental policies.

"The oil industry is ready to invest millions in new and improved plan construction in 1938, if the federal government will modify its present tax policy," according to Col. T. H. Barton, president, Lion Oil Refining Co.

Pipe line building is relatively slow. Existing lines are adequate to accommodate transportation of crude oil, though additional gathering lines become necessary as new wells are brought in.

Future pipe activity probably will center in gasoline lines. Comparatively little gasoline now is carried by pipe lines, although an increasing number are being built.

Tank Demand More Active

Recent freight rate increases, coupled with higher gasoline demand, is expected to stimulate gasoline pipe line expansion. Contemplated are at least two large lines in Mid-Continent district. Under way is the Shell line from Wood River, Ill., to Indianapolis and on to Ohio points.

Also to be stimulated by the freight rate increase is water transportation. Substantial steel tonnages will be used in tanker construction. About 80 now are being built in various shipyards, the great majority of them for inland waterway service.

Heavy stocks of crude oil and gasoline are taxing present storage facilities. Tank builders report a pickup in demand for storage tanks during the past several weeks following a lull earlier in the year. They anticipate a fairly good business in such units during the balance of the year. The oil industry, incidentally, represents the principal outlet for tanks at present.

Modernization of service stations is being spurred moderately by campaigns from various sources and will require some light steel.

Diesel engine development, which may be stimulated as cheaper transportation is sought, and growing favor of oil burners for residential heating are other factors which are helping the petroleum industry.

In 1937, oil, gas and water requirements for finished steel were more than 1,900,000 tons, according to STEEL's distribution figures. Present and projected operations indicate the oil and gas industry will take comparable tonnages in 1938.

Any renewal of government "pump priming" should stimulate further extension and improvement of municipal water systems, bolstering demand from that source.

4200-Foot Chain For Sea Plow

A CHAIN 4200 feet long, reported to be the longest ever forged, has been completed by the Baldt Anchor, Chain & Forge Co., Chester, Pa., to be used in dragging a 10-ton cast and forged steel plow along the bottom of the Atlantic ocean, to make a furrow in which will be laid cables connecting the Irish coast with the United States.

Forged of 3.50 per cent nickel steel round bars, the die-lock chain weighs 43,000 pounds and has a tensile strength of 125,000 pounds per square inch. There are 12,500 links, each 1¼-inch diameter, 7½ inches long and 4½ inches wide.

Employing a steam drop hammer manufactured by the Erie Foundry Co., Erie, Pa., the Baldt works forged each link by closing one-half around the other. The chain was heat treated, with a definite uniform strength established for each link. It is uniform in pitch, as a result of drop forging practice.

Stowed in the hold of the Western Union cable ship, LORD KELVIN, it will be paid out from large steel sheaves.

The submarine plow was made in England. It is 10 feet long and has a share self-adjusting to the ocean bottom.

In one operation it cuts a furrow, feeds the cable into it, and then closes it over the cable.

One of the major requirements was a line capable of withstanding a 65,000-pound stress, and flexible enough to permit its management by the complicated paying-out equipment. The standard length for marine chain is 90 feet.

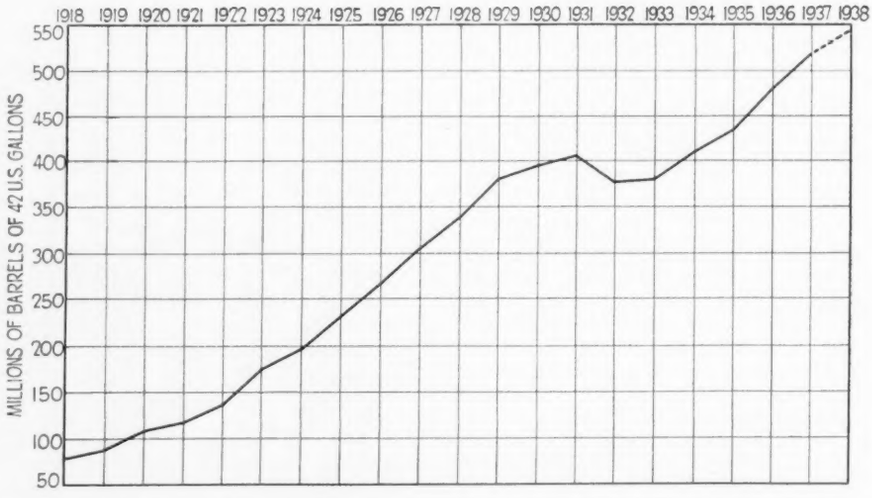
Plowing in the cables is planned to protect them from heavy steel "otterboards" dragged along the bottom by steam trawlers, most numerous off the Irish coast. These are said to cause an annual damage of about $500,000 to the combined cable systems of the world.

No Streamlining for London Subway Cars

New coaches for underground trains, costing about £6,000,000, have been ordered by the London Passenger Transport board, and the contracts stipulate that of the 2050 on order, 500 shall be delivered this year, according to *Industrial Britain*.

"They will not be built on streamlined principles, the board's experiments having proved that there is no advantage either in speed or economy of operation to compensate for the loss of seating capacity in streamlined coaches," says the publication, issued by the Travel and Industrial Development association of Great Britain and Ireland, London.

Gasoline: Depression-Proof Commodity?



Gasoline demand has climbed steadily during past two decades. Even in the last depression consumption slackened only slightly. In only one year, 1932, did it fail to register a gain over the preceding year, and in only two years, 1932 and 1933, did it fail to establish a new record in demand. Consumption for 1938 is estimated on a basis of 5 per cent increase

March Iron Production Gains 2.5 Per Cent; Furnaces Remain at 91

■ PRODUCTION of coke pig iron in the United States registered a small increase in March, average daily output rising 2.5 per cent above the February rate. February was better than January by a narrow margin. Blast furnaces active March 31 totaled 91, the same as at the close of the two prior months.

March daily production averaged 47,851 gross tons, this being a gain of 1196 tons over February rate of 46,655 tons. The March rate was the best since December, 1937, with 48,499 tons, and the lowest March since 1933 with 17,484 tons. March, a year ago, averaged 111,951 tons daily.

Total output for March was 1,483,368 gross tons, which topped February production of 1,306,333 tons by 177,035 tons, or 13.5 per cent. This was the best monthly total since December, 1937, with 1,503,474 tons, but the lowest March since since 1933 with 542,013 tons. Production in March, one year ago, amounted to 3,470,470 tons.

MONTHLY IRON PRODUCTION
Gross Tons

	1938	1937	1936
Jan.	1,444,862	3,219,741	2,029,304
Feb.	1,306,333	3,020,006	1,838,932
March	1,483,368	3,470,470	2,046,121
Tot. 3 mo.	4,234,563	9,710,217	5,914,357
April	.....	3,400,636	2,409,474
May	.....	3,545,180	2,659,643
June	.....	3,115,302	2,596,528
July	.....	3,501,359	2,595,791
Aug.	.....	3,616,954	2,711,726
Sept.	.....	3,417,960	2,728,257
Oct.	.....	2,891,026	2,991,794
Nov.	.....	2,007,031	2,949,942
Dec.	.....	1,503,474	3,125,192
Total	.....	36,709,139	30,682,704

Total output for first three months of this year was only 4,234,563 gross tons. This was a drop of 5,475,654 tons, or 56.5 per cent, compared with the 1937 first quarter production of 9,710,217 tons. First quarter output in 1936 was 5,914,357 gross tons.

Relating production to capacity, operations in March averaged 34.5 per cent, against 33.6 per cent in February, the same figure in January and 35.6 per cent last December. Operating rate for March, a year ago, averaged 82.5 per cent.

During March, two steelworks or nonmerchant stacks resumed activity and one was taken out of blast, making a total increase of one unit for this class. One merchant unit was removed from production and none resumed. Thus the number remaining in blast was 91.

In March, 1937, furnaces making iron totaled 182. The high point for last year was 192 in July.

Blast furnaces resuming in March were: In Pennsylvania: No. 3 Aliquippa, Jones & Laughlin Steel Corp.

AVERAGE DAILY PRODUCTION
Gross Tons

	1938	1937	1936	1935
Jan.	46,608	103,863	65,461	47,692
Feb.	46,655	107,857	63,411	57,675
March	47,851	111,951	66,004	57,120
April	.....	113,354	80,316	55,719
May	.....	114,360	85,795	55,986
June	.....	103,843	86,551	51,949
July	.....	112,947	83,735	49,043
Aug.	.....	116,676	87,475	56,767
Sept.	.....	113,932	90,942	59,009
Oct.	.....	93,259	96,509	63,818
Nov.	.....	66,901	98,331	68,876
Dec.	.....	48,499	100,813	68,242
Ave.	47,051	100,573	83,832	57,694

In West Virginia: Riverside, Wheeling Steel Corp.

Stacks blowing out or banking were: In Ohio: River No. 1, Republic Steel Corp. In Alabama: One Woodward, Woodward Iron Co.

Steel Employment Off 3 Per Cent in February

■ An average of 461,000 employes was on payrolls of the steel industry in February, 3 per cent less than the average of 475,000 in January, and 17 per cent below February 1937, when 556,000 were employed.

Total payrolls in February amounted to $45,599,000, about 4 per cent below the January total of $47,578,000, and 39 per cent lower than $74,278,000 in February last year, according to the American Iron and Steel institute.

Neither employment nor payrolls have declined as sharply as has output over the six-month period from August 1937 through February this year. Compared with a 60 per cent drop in production, employment has declined only 24 per cent and payrolls only 51 per cent.

MARCH IRON PRODUCTION

	No. in blast last day of Mar.	No. in blast last day of Feb.	Total tonnage Merchant	Total tonnage Nonmerchant
Ohio	20	21	44,705	273,739
Penna.	28	27	24,573*	381,472*
Alabama	12	13	77,400*	104,431*
Illinois	6	6	69,797	57,925
New York	6	6	27,691	68,832
Colorado	1	1		
Indiana	7	7	10,013	248,669
Maryland	4	4		
Virginia	0	0		
Kentucky	1	1		
Mass.	0	0		
Tenn.	0	0		
Utah	1	1	4,023	90,098
West Va.	2	1		
Michigan	2	2		
Minnesota	1	1		
Missouri	0	0		
Total	91	91	258,202	1,225,166

*Includes ferro and spiegeleisen.

World Tin Consumption Declines in January

■ World tin consumption in January dropped to 13,800 tons compared with 16,800 tons in December, 1937, and 16,200 tons in January, 1937, according to the International Tin Research and Development council.

Only country to show a marked increase in January this year was Russia, which imported 2307 tons compared with 664 tons in January, 1937. Consumption in the United States fell from 8115 tons to 4825 tons, and in the United Kingdom, from 1935 to 1016 tons. A decided upward trend in consumption continues in Russia , Germany, Holland and Japan.

Largest percentage increases for the year ending January 1938 occurred in Russia, 172.5 per cent; Germany, 35.6; and Japan, 26.6. Total world consumption for the year ended January 1938 increased 19.4 per cent.

World tin plate production for January was off 109,000 tons to 214,000 tons.

RATE OF OPERATION
(Relation of Production to Capacity)

	1938[1]	1937[2]	1936[3]	1935[4]
Jan.	33.6	76.6	48.2	34.2
Feb.	33.6	79.5	46.4	41.4
March	34.5	82.5	48.5	41.0
April	....	83.7	59.1	40.0
May	....	84.3	63.1	40.2
June	....	76.6	63.6	37.2
July	....	82.9	61.5	35.2
Aug.	....	85.7	64.3	40.7
Sept.	....	83.7	66.9	42.5
Oct.	....	68.4	71.0	45.8
Nov.	....	49.3	72.3	49.5
Dec.	....	35.6	74.2	49.0

[1] Based on capacity of 50,606,400 gross tons, Dec. 31, 1937; [2] first half on capacity of 49,512,737 tons, Dec. 31, 1936—second half on capacity of 49,727,737 tons, June 30, 1937; [3] capacity of 49,777,893 tons, Dec. 31, 1935; [4] capacity of 50,845,741 tons, Dec. 31, 1934. Capacities by American Iron and Steel institute.

■ First aid treatment for small cuts and scratches prevented serious infections resulting from shop work in Westinghouse Electric & Mfg. Co. plants last year, according to Dr. T. Lyle Hazlett, medical director. While employment increased 7000 the accident rate advanced only two-tenths of 1 per cent.

Keep Up the Letters to Congressmen, Gen. Johnson's Advice to Engineers

■ IF ATTENDANCE and enthusiasm are any criteria, the first national passenger car meeting of the Society of the Automotive Engineers, held last week in Detroit's Hotel Statler, was a great success.

Attendance at four technical sessions was 220, 210, 340 and 300, respectively. Over 600 joined in the dinner meeting Tuesday evening, and 600 more came in to hear Gen. Hugh S. Johnson's address on "The Outlook for Business."

Climax of the meeting was the fiery address delivered in characteristic style by General Johnson who kept his audience roaring with his rhetorical jabs at the "confidence-destroying policies" of the New Deal. He declared that unless some of the "dark angels" can be removed from power at Washington, as far as the outlook for business is concerned—"there ain't none."

He maintained that the "intensified restriction of initiative by the government broke the prosperity of 1937 just as the sudden reversal of policy in 1933 broke the prosperity which arose during the first 100 days of the new administration."

As far as the much-discussed lower one-third of the country's population is concerned, the general pointed out that "five years of economic snake-oil remedies" have left them worse off than they ever were before. As a corrective measure, he advocated "throwing cock-eyed brainstormers out the window" and returning to old and tested economic principles.

Most encouraging aspect of the Washington situation, he said, was the growing revolt of congress against the President. He predicted overwhelming passage of the Harrison tax reform measure, and forecast a bitter battle over passage of a new reorganization bill.

He urged private citizens to continue to flood their representatives with telegrams and letters of protest against undemocratic legislation, and called this development one of the surest signs of an awakening electorate. He bitterly condemned the President's statement that the senate "could not be bought" by telegrams and letters.

He predicted that an honest inquiry into the TVA setup would disclose manipulation of cost figures so ridiculous the public "would laugh it to death." And, he added, the TVA could stand criticism, but never ridicule.

Four technical sessions were devoted to engines, chassis, car suspensions, and frames and bodies.

Comprehensive investigation of supercharging by means of engine dynamometer tests was reported by Richard B. Sneed, Ethyl Gasoline Corp. With regard to durability of engine parts in the test, he cited satisfactory performance of chrome-nickel steel intake valves. Regrinding was necessary after 100 hours' operation.

Exhaust valves were selected as engine conditions dictated, and included silcrome No. 1, S.A.E. 2112, and stellite-faced material. In general, exhaust valve life was short,

(*Please turn to Page* 62)

Managers "Plan For Stability"

■ "PLANNING for Business Stability" was the keynote of the second annual Midwest industrial management conference held under the auspices of the Industrial Management society in the Auditorium hotel, Chicago, March 25-26.

A number of the talks presented at the meeting related to factors which influence business trends. The annual wage for workers as a means of stabilizing business was discussed by George E. Smith and Wilder M. Morrison, senior staff engineers of Booz, Fry, Allen & Hamilton, management engineers, Chicago.

A scientific approach to personnel problems has been lacking, according to Albert Sobey, director, General Motors Institute, Flint, Mich. Pointing out that the attention given to development of personnel has been much less than that accorded development of products, he indicated the importance of adequate training of employe supervisors.

Other matters relating to employes were treated in a talk on "Employer—Employe Relations" by C. S. Craigmile, vice president, Belden Mfg. Co., Chicago.

The importance of education in effecting business stability was discussed by two speakers, Russell J. Greenly, associate professor, Purdue university, Lafayette, Ind., and Henry T. Heald, acting president, Armour Institute of Technology, Chicago.

"Capitalism and Business Research" was the subject of a talk by N. H. Engle, bureau of foreign and domestic commerce, department of commerce, Washington. E. H. Farrell, comptroller, Stewart-Warner Corp., Chicago, discussed accounting, while "Industry's Place in Time of War" was presented by Brig. Gen. John G. Clinnan, Chicago attorney. E. E. Oberland, Western Electric Co., Chicago, described a method for evaluating different types of jobs.

Streamlined Locomotives To Haul 15-Car Trains

■ **Streamlined electric locomotives rated at 3600 horsepower, to haul 15-car trains at more than 80 miles per hour for the New York, New Haven & Hartford railroad, are being built by General Electric Co. at Erie, Pa. They operate from third rail or overhead wire. Five of the six in this fleet are shown above, the one nearest completion, in the foreground, to be delivered about April 15**

Stettinius Heads U. S. Steel; Taylor Says Farewell to Stockholders

■ THIRTY-EIGHTH annual stockholders' meeting of United States Steel Corp. in Hoboken, N. J., April 4, marks the termination of Myron C. Taylor's active stewardship of Big Steel.

Corporation officials anticipate a large attendance as it is expected the 64-year-old chairman will present a summation of corporation affairs.

Drafted as chairman of the finance committee in December, 1927, and elected chairman of the board in 1932, Mr. Taylor has guided the corporation through a changing economic cycle unparalleled in history. The past decade tested his leadership in prosperity and adversity.

While he retires as chairman of the board, Mr. Taylor will continue as a director and member of the finance committee, with offices still on the top floor of 71 Broadway. Thus he will be available should the new leadership seek counsel and advice.

Occupying the chair vacated by Mr. Taylor will be 38-year-old Edward R. Stettinius Jr., who has been chairman of the finance committee since Jan. 1, 1936. Before joining the steel corporation in 1934, Mr. Stettinius spent ten years with General Motors in various capacities, including assistant to the president, Alfred P. Sloan Jr., and vice president of the corporation.

Typical of Mr. Taylor's program of elevating younger men to high executive positions was the selection of Mr. Stettinius as his successor. Well prepared for the position, Mr. Stettinius' election was predicted many months ago, caused little surprise when announced last fall.

Succeeding Mr. Stettinius as finance chairman will be Enders M. Voorhees, 46, for the past year vice chairman of the finance committee. Mr. Voorhees is a comparative newcomer to steel. Before joining U. S. Steel April 1, 1937, he was vice president and director, Johns-Manville Corp.

The new officers will be elected formally at a directors' meeting Tuesday, April 5, and will take office immediately.

ORIGIN OF FEBRUARY IMPORTS

Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferro-manganese
Norway	7,000	.....	.....	512
Sweden	7,200	.....	.....	.....
Chile	129,200	.....	.....	.....
Australia	8,400	.....	.....	.....
Other countries	14	.....	.....	.....
Netherlands	.....	100	.....	.....
Canada	.....	412	.....	.....
British India	.....	2,842	.....	.....
Soviet Russia	.....	.....	42	.....
Cuba	.....	.....	5,557	.....
Brit. W. Africa	.....	.....	6,986	.....
France	.....	.....	.....	49
Japan	.....	.....	.....	73
Total	151,814	3,354	12,585	634

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
Belgium	633	1,741	1,291	1,147
Germany	476	66	15	93
Sweden	2	.....	292	.....
United Kingdom	7	20	24	.....
France	.....	245	23	23
Canada	.....	.....	1	.....
Czechoslovakia	.....	.....	20	.....
Total	1,118	2,072	1,666	1,263

February Imports Lowest Since '35

■ IMPORTS of iron and steel products in February were lowest of any month since March, 1935. They were 19,589 tons, valued at $1,414,688, compared with 29,631 tons, valued at $1,680,955 in January, a decline of 33.4 per cent in quantity and 15.8 per cent in value. Compared with February, 1937, when imports totaled 40,728 tons, valued at $1,671,272, the decline was 48.8 per cent in volume and 15.3 per cent in value, according to the metals and minerals division, department of commerce. In the first two months total imports were 49,220 tons, valued at $3,095,643, compared with 83,791 tons, valued at $3,387,596 in the corresponding period of 1937, a loss of 37.9 per cent in quantity and 8.6 per cent in value.

Usually when exports have been high imports also have been of substantial volume. Recently this condition has not been in evidence. Increased consumption of steel and iron in Europe and the Far East has reached new high levels, bringing heavy demand for products of the United States and limiting supplies available for shipment here.

Values of imported material have declined much less abruptly than tonnage because of sharp increases in quotations on most items. The composite average for ten leading products in the first two months this year was $62.64, in comparison with $52.29 in the like period of 1937 and $45.09 in 1936. The average price of pig iron in the first two months of 1938 was $19.03, in 1937 it was $13.60 and in 1936 it was $13.93. Other prices were higher in about the same proportion.

U. S. IMPORTS FOR CONSUMPTION OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Feb. 1938	Jan. 1938	Jan. thru Feb. '38
Pig iron	3,354	9,747	13,101
Sponge iron	150	11	161
Ferromanganese (1)	634	647	1,281
Spiegeleisen	306	125	431
Ferrochrome (2)	...	20	20
Ferrosilicon (3)	48	56	104
Other ferroalloys (4)	.....	1	1
Steel ingots, blooms, etc.	.....	...	...
Billets	21	233	254
Concrete reinforc. bars	263	45	308
Hollow bar, drill steel	103	125	228
Bars, solid or hollow	1,403	1,854	3,257
Iron slabs	...	...	...
Iron bars	116	10	126
Wire rods	588	504	1,092
Boiler, other plate	33	4	37
Sheets, skelp, saw plate	1,118	421	1,539
Die blocks or blanks	4	3	7
Tin plate, taggers' tin and terne plate	7	1	8
Structural shapes	2,072	3,147	3,219
Sashes and frames	.....	.....	.....
Sheet piling	...	...	.....
Rails and fastenings	338	184	522
Cast iron pipe, fittings	53	201	254
Malleable iron pipe fittings	8	11	19
Welded pipe	603	301	904
Other pipe	3,378	4,760	8,138
Cotton ties	..	19	19
Other hoops, bands	1,263	2,177	3,440
Barbed wire	1,899	3,242	5,141
Round iron, steel wire	127	73	200
Telegraph, telephone wire	2	..	2
Flat wire and strips	337	263	600
Wire rope and strand	165	213	378
Other wire	111	259	370
Nails, tacks, staples	898	536	1,434
Bolts, nuts, rivets	9	12	21
Horse and mule shoes	27	31	58
Castings and forgings	151	173	324
Total gross tons	19,589	29,409	48,998
Iron and steel scrap	.....	222	222
GRAND TOTAL	19,589	29,631	49,220

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1938 Exports	1938 Imports	1937 Exports	1937 Imports
Jan.	586,294	29,631	201,692	43,063
Feb.	460,640	19,589	290,987	40,728
2 mo.	1,046,934	49,220	492,679	83,791
March	.....	.....	570,584	51,805
April	.....	.....	683,674	68,197
May	.....	.....	969,222	49,050
June	.....	.....	826,534	44,771
July	.....	.....	889,438	47,012
Aug.	.....	.....	836,319	61,489
Sept.	.....	.....	543,740	37,071
Oct.	.....	.....	522,611	37,186
Nov.	.....	.....	556,591	26,996
Dec.	.....	.....	626,418	25,792
Total	.....	.....	7,567,884	533,160

Machine Company To Give Three Scholarships

■ Three scholarships totaling $400 in value will be awarded by the Allied School of Mechanical Trades, school division of Allied Screw Machine Co. Inc., Chicago, for the best 300-word paper on the subject: "The Importance of the Machinist and Tool and Die Maker to Industry."

First prize is a combined allied metal trades course, and the other two prizes consist of optional courses to be selected by the winners. The contest closes midnight, May 31, 1938, and is open to all.

MEN OF INDUSTRY

■ R. T. ROWLES, W. H. Wiewel and H. J. Watt have been appointed assistant general managers of sales, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Rowles will supervise general sales activities of the hot rolled, cold finished, wire products, and warehouse departments. Mr. Wiewel will supervise sales of by-products and pig iron, sheets and strip, tin plate and tubular products. Mr. Watt will have general supervision of eastern district sales offices, including Boston, New York, Philadelphia, Atlanta, Ga., and the new district sales office in Baltimore.

Other promotions and appointments in the company's district sales offices, effective April 1, are as follows:

Arthur A. Wagner, assistant manager of hot rolled sales, becomes manager of hot rolled sales, succeeding Mr. Rowles. John O'H. Anderson, assistant district sales manager in New York, becomes manager of sales, tubular products, succeeding Mr. Wiewel. E. J. Dickson becomes assistant manager of sales, tubular products, in Pittsburgh.

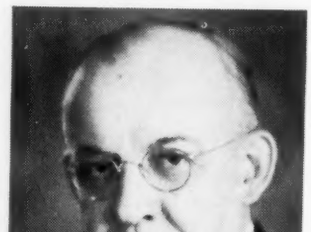
The new district sales office in Baltimore will be in charge of V. A. Jevon, as district sales manager, and H. R. Dorney, as assistant district sales manager, the latter being promoted from the Philadelphia office. Mr. Jevon is a new man in the organization, coming from the Baltimore office of Bethlehem Steel Co., where he was assistant manager of sales since 1933.

John B. DeWolf is appointed district sales manager in Philadelphia, succeeding Thomas C. Ham, who has been transferred to Pittsburgh to supervise the corporation's industrial training plan. Herbert B. Spackman is made assistant district sales manager at Philadelphia. Mr. DeWolf formerly was assistant manager of tin plate sales, Republic Steel Corp., Cleveland, while Mr. Spackman previously had been with the Bethlehem Steel Co.'s sales departments at Buffalo and Philadelphia.

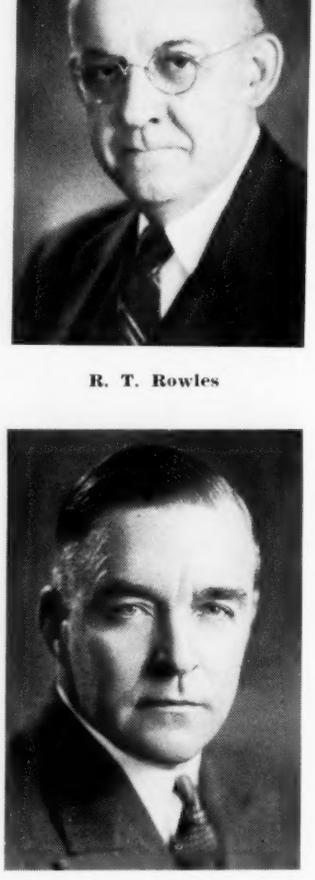
Edward H. Hughes is made district sales manager at St. Louis, succeeding J. B. Hungate, resigned.

Two new assistant district sales managers have been appointed in New York, William K. Breeze, transferred from the Cincinnati office, and Hughart R. Laughlin, at present in the New York office.

F. B. Kittredge has been promoted from the Philadelphia office to assistant district sales manager at Boston, and Charles M. Mason has been promoted from the Cleveland office to assistant district sales manager at Buffalo.



R. T. Rowles



W. H. Wiewel

H. J. Watt

♦

Charles E. Wilson, executive vice president, and Philip D. Reed, assistant to the president, General Electric Co., Schenectady, N. Y., have been elected directors of the company.

♦

A. H. Friese, president, Welding Engineering Co., Milwaukee, sailed last week with his family on a vacation trip to Bermuda.

♦

C. H. Pomeroy, secretary-treasurer, National Malleable & Steel Castings Co., Cleveland, has been elected to the board of directors.

♦

Eugene Gruenewald has been elected president, Ross Gear & Tool Co., Lafayette, Ind., succeeding David E. Ross, who has become chairman of the board.

♦

G. T. Mahaney and J. D. Platt have been appointed eastern and western retail sales managers, respectively, of the Diesel Engine division of General Motors Sales Corp., with headquarters in Cleveland.

♦

Isaac Tripp Jr. has been elected vice president in charge of sales, Oak Chemical Products Co., Bechtelsville, Pa., producer of drawing lubricants, soaps and chemicals. Alfred G. Wilby remains in charge of the chemical laboratory and production.

♦

W. C. Davis, for 41 years associated with the Simplex Wire & Cable Co., Cambridge, Mass., has been made vice president. He is succeeded in his former post as sales manager by G. L. Roberts, assistant sales manager since 1927. G. A. Grauer becomes assistant sales manager.

♦

Wallace D. Walker has been elected president, Talon Inc., formerly known as the Hookless Fastener Co., with plants in Meadville and Erie, Pa. He succeeds his father, the late Col. Lewis Walker. Other officers are: Vice president, T. F. Soles; vice president and secretary, W. C. Arthur; treasurer, P. K. Poulton.

♦

R. H. Daisley, W. H. Wallace and W. H. Crawford have been elected vice presidents, Eaton Mfg. Co., Cleveland. Mr. Daisley is manager of the Wilcox-Rich division, Detroit. Mr. Wallace is manager of the spring division, Detroit, and Mr. Crawford is manager of the Reliance Spring Washer division at Massillon, O.

♦

Forrester L. Kennedy, district sales manager in New York for the Allegheny Steel Co., the past eight years, has been named district sales manager, Great Lakes Steel Corp.,

a subsidiary of National Steel Corp. B. W. Johnson, associated with the Allegheny company 35 years, in various sales capacities, succeeds Mr. Kennedy as district sales manager at New York.

♦

Frank L. McKenna, formerly production manager, Detroit Stamping Co., Detroit, recently sailed for England to become sales engineer for Knu-Vise Products Co. Ltd., Victoria road, Willesden, N.W. 7, London.

♦

W. Donald Coulter, since 1924 associated with the James H. Tower Iron Works, Providence, R. I., in the estimating and sales department, and for the past year as structural engineer, has become general manager. A graduate engineer of the University of Toronto, Mr. Coulter prior to his affiliation with the Tower Iron Works was with the Standard Steel Construction Co., Port Robinson, Ont.; Lackawanna Bridge Co., Buffalo, and Bethlehem Steel Co., Bethlehem, Pa.

♦

J. W. Wagoner, formerly general manager, Salem Engineering Co., Salem, O., has been appointed vice president in charge of all operations. He will be in complete charge

J. W. Wagoner

of operations at the home office as well as Pittsburgh, New York, Welland, Ont., London and on the Continent.

♦

William S. MacKenzie, for the past several years in the purchasing and sales department of the Columbia Chemical division, Pittsburgh Plate Glass Co., Barberton, O., has been named representative for the Betz-Pierce Co., Cleveland, covering the northeastern Ohio territory, including Akron, Canton, Alliance, Warren, Youngstown, Salem, Columbiana, Painesville and Ashtabula.

♦

E. C. Kiekhaefer has been appointed chief engineer, Stearns Magnetic Mfg. Co., Milwaukee, formerly

Frank L. McKenna

Magnetic Mfg. Co. Mr. Kiekhaefer started with the organization as a draftsman and subsequently became superintendent. J. H. Driscoll has been appointed representative in Boston for the Stearns company. He will have headquarters at 34 Lewis wharf.

♦

William E. Bee, president, Palmer-Bee Co., Detroit, manufacturer of power transmission and materials handling machinery, since its founding in 1905, has become chairman of the board. George A. Bee has been made president and general manager. J. E. McBride remains as vice president; A. J. Leckie is treasurer; C. F. McLaren is assistant treasurer; D. N. Sweeney is secretary, and L. F. Miller, assistant secretary.

♦

L. W. Martin has been appointed district sales manager, American Car & Foundry Co., with headquarters in St. Louis. He entered the company's employ at the St. Charles Mo., shops in 1902. Subsequently he was transferred to the St. Louis shops, and in 1907 joined the St. Louis sales office. Shortly after the outbreak of the World war he was transferred to the American Car & Foundry Export Co. He resumed sales work with American Car & Foundry Co. in 1920.

DIED:

■ ARTHUR J. LOCKWOOD, 86, retired, for many years president, Edgar T. Ward's Sons Co., Newark, N. J., at Glen Ridge, N. J., March 13. A native of England, Mr. Lockwood came to this country when 21. For many years he was head of Temple & Lockwood Co., later the firm of Dilworth, Lockwood & Co. In 1918 the latter was merged with Edgar T. Ward's Sons Co. He was former president, American Iron, Steel and Heavy Hardware association, now the American Steel Warehouse association. He was prominent in civic affairs, serving as mayor of Glen Ridge several terms.

♦

James F. Brousil, 31, purchasing agent, Bettcher Mfg. Co., Cleveland, in that city, March 19.

♦

H. W. Steele, president, Shelby Spring Hinge Co., Shelby, O., in that city, March 14.

♦

Harry S. Carland, 58, for 18 years district sales manager in New York for Reading Iron Co., Reading, Pa., in that city, March 28.

♦

Fletcher L. Byrom, 53, a buyer for the American Steel & Wire Co., Cleveland, March 29, in Cleveland. He had been associated with the company since 1900.

♦

Charles Woodward Andrews, for 15 years associated with H. A. Brassert & Co., Chicago, and for most of that period a vice president in charge of research and development, in that city, March 15.

♦

Albert E. Dubov, 44, the past 13 years district sales manager at Kansas City, Mo., for Truscon Steel Co., in that city, recently. He was in Truscon's Cleveland office for seven years prior to going to Kansas City.

♦

George M. Forker, 48, vice president, Koppers Co., Pittsburgh, in Pittsburgh, March 23. He had spent practically his entire business life with Rust Engineering Co. and Koppers.

♦

Albert Mathews, identified with the Follansbee Bros. Co., Follansbee, W. Va., for 35 years and one of the oldest members of the organization in years of service, in New York, March 28. He had been district sales manager in New York.

♦

Harry P. Forker, 74, closely identified with the iron and steel development of Sharon, Pa., in the 1900's, in that city, March 28. He was associated with the late Frank H. Buhl in developing the early Sharon steel works, including Sharon Iron Works and Buhl Steel Co. In 1901 he became secretary, Sharon Tin Plate Co., which later was taken over by American Tin Plate Co.

♦

Logan T. Wood, 51, vice president and general manager, Gar Wood Industries Inc., Detroit, in San Francisco, March 28, while on a business trip. In 1917 he became Chicago branch manager, Wood Hydraulic Hoist & Body Co., and when the latter acquired the Horizontal Hydraulic Hoist Co., Milwaukee, Mr. Wood became president of that company. He joined Gar Wood Industries in 1921.

Tool Chapters Elect Officers

■ FOLLOWING is a complete list of officers elected recently by the 17 chapters of the American Society of Tool Engineers. National officers were elected at the annual convention in Detroit, week of March 7 (STEEL, March 14, p. 32).

For each chapter, in the accompanying list, the first name is that of the chairman; second, the vice chairman; third, secretary; fourth, treasurer. The Cleveland and Chicago chapters, however, have not yet elected vice chairmen.

Detroit

Floyd W. Eaton, supervisor of apprentices, Burroughs Adding Machine Co.
Charles W. Thiede, chief tool engineer, Jefferson plant, Chrysler Corp.
Ralph M. Smith, process engineer, Detroit Gear & Machine Co.
George E. Demorest, welder processing, Fisher Body. Co.

Racine, Wis.

Eugene Bouton, supervisor, time study, J. I. Case Co.
Bradford J. Kiner, superintendent of inspection, Nash Motors Co.
H. E. Munch, J. I. Case Co.
H. C. Falkenrath, superintendent, Racine Screw Works.

Cleveland

Paul F. Rossbach, chief tool designer, axle division, Eaton Mfg. Co.
Henry P. Boggis, manager, Henry P. Boggis & Co.
Charles W. Scheihing, general foreman, National Carbon Co. Inc.

Milwaukee

Eldred A. Rutzen, tool engineering department, Cutler-Hammer Inc.
Harold L. Heywood, chief inspector, Kearney & Trecker Corp.
Julius Riedl, chief tool designer, Seaman Body Corp.
Sid Hall, Hall Steel Co.

Chicago

Clifford E. Ives, Clifford E. Ives Co.
Robert O. Hein, chief draftsman, Sears, Roebuck & Co.
Conrad Hansen, tool designer, Edison General Electric Appliance Co.

Bridgeport, Conn.

Chester A. Dundore, tool supervisor, Underwood Elliott Fisher Co.
Benjamin A. Page, time study engineer, Bullard Co.
H. J. DeAngelis, engineer, Locke Mfg. Co.
Harold Carter, foreman, Singer Mfg. Co.

Hartford, Conn.

I. F. Holland, division superintendent, Pratt & Whitney division of Niles-Bement-Pond Co.
Ray H. Morris, Ray H. Morris Co.
Frederic L. Woodcock, tool supervisor, United Aircraft Corp.
Henry I. Moore, district manager, Firth Sterling Steel Co.

Pittsburgh

Gregory P. Grace, general superintendent, Robertshaw Thermostat Co.
James P. Wiley, general foreman, National Tube Co.
E. D. Gangwere, manufacturing engineer, Westinghouse Electric & Mfg. Co.
Malcom F. Judkins, chief engineer, Firth-Sterling Steel Co., Firthite Division.

Minneapolis, St. Paul

George W. Wise, tool room superintendent, Minneapolis Honeywell Regulator Co.
E. F. Huot, Huot Mfg. Co.
Morgan H. Potter, instructor of machines, Dunwoody Industrial institute.
C. V. Bakule, chief tool designer, Minneapolis Moline Power Implement Co.

Toledo, O.

August Ehrhardt, process engineer, Spicer Mfg. Corp.
Arthur Bok, chief engineer, Kent Owens Machine Co.
Lorence E. Rennell, chief tool designer, Spicer Mfg. Corp.
Noel Franklin, process engineer, Spicer Mfg. Corp.

Buffalo

Howard C. Taylor, president, Acme Pattern & Machine Co.
O. W. Winter, factory manager, Columbus McKinnon Chain Co.
William F. Weinreich, tool engineer, Worthington Pump & Machinery Corp.
Benjamin C. Buerk, Buerk Tool Works.

Rockford, Ill.

E. W. Dickett, proposal engineer, Sundstrand Machine Tool Co.
George Johnson, chief engineer, W. F. & John Barnes Co.
Herbert O. Olson, tool engineer, Barber Colman Co.
H. J. Caldwell, assistant chief engineer, Barnes Drill Co.

Baltimore

Nils H. Lou, tool room foreman, Glenn L. Martin Co.
Carroll L. Vansant, tool designer, Black & Decker Mfg. Co.
J. Harvey Chandler, tool designer, Glenn L. Martin Co.
John P. O'Connor, tool designer, Glenn L. Martin Co.

New York

C. Frank Sheeley, supervisor of tool design, Hyatt Bearings, division of General Motors Corp.
Herbert D. Hall, sales engineer, Vandyck Churchill Co.
Ben C. Brosheer, associate editor, *American Machinist*.
R. Rege, manager production engineering department, Wright Aeronautical Corp.

Philadelphia

Conrad O. Hersam, consulting engineer, Industrial Cons. Engineering Co.
William L. Battersby, representative, Logansport Machine Inc.
Edward R. Glenn, Edward R. Glenn Co.
Paul W. Frankfurter Sr., sales engineer, Paul W. Frankfurter Co.

Rochester, N. Y.

John S. Bartek, tool designer, Consolidated Machine Tool Co.
Charles E. Codd, master mechanic, Ritter Dental Mfg. Co.
John C. Dense, manager tool division, Delco Appliance division of General Motors Corp.
Milton L. Roessel, tool designer, Eastman Kodak Co.

St. Louis

E. A. Doogan, engineer machine division, Hussmann-Ligonier Co.
C. M. Andrews, chief tool designer, Wagner Electric Co.
Herbert F. Tomasek, die designer, General Metal Production Co.
Harry P. Linders, master mechanic, Wagner Electric Corp.

E. W. Bliss Co. Booklet Notes 80 Years' Growth

■ Reflecting on 80 years of supplying the pressed metal industry, E. W. Bliss Co., Brooklyn, N. Y., manufacturer of metalworking presses and rolling mill equipment, has just issued a 32-page pictorial brochure. Founded in 1857, the company has plants at Brooklyn, N. Y., Hastings, Mich., Salem, O., Cleveland, London, England, and Paris, France. Pictures of these factories are shown in the brochure, with the equipment manufactured by the company.

The company makes presses in all sizes, from watchmakers' bench presses to the heavy automotive type.

C. R. Culling Heads Gray Iron Founders

■ C. R. Culling, vice president, Carondelet Foundry Co., St. Louis, was elected president of the Gray Iron Founders' Society Inc. at the closing session of the national convention in Buffalo March 25. He succeeds Peter E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, O.

S. C. Mefford, secretary-treasurer, Auburn Foundry Inc., Auburn, Ind., was elected treasurer, succeeding W. L. Seelbach, secretary-treasurer, Forest City Foundries Co., Cleveland. Officers re-elected: R. E. Kucher, Olympic Foundry Co., Seattle, vice president; J. H. Pohlman, Pohlman Foundry Co. Inc., Buffalo, secretary.

Directors include, in addition to new and retiring officers: M. D. Bingham, Somerville Iron Foundry Co., Somerville, Mass.; A. A. Campbell, Dake Engine Co., Grand Haven, Mich.; A. C. Denison, Fulton Foundry & Machine Co., Cleveland; E. C. Graham, Acme Foundry & Machine Co., Blackwell, Okla.; William J. Grede, Liberty Foundry Inc., Wauwatosa, Wis.; F. R. Hoadley, Atwood Machine Co., Stonington, Conn.; H. R. Lafferty, Red Jacket Mfg. Co., Davenport, Iowa; W. P. Laytham, Wm. P. Laytham & Sons Co., Paterson, N. J.; W. F. Mosser, W. F. Mosser & Son, Allentown, Pa.; R. D. Phelps, Francis & Mygren Foundry Co., Chicago; A. H. Torrence, Indiana Foundry Co., Indiana, Pa.

Highest Skyscraper in Britain To Be 300 Feet

■ Over 600 tons of steel and more than 500,000 rivets and bolts were used in constructing Tait's tower, the 300-foot skyscraper now nearing completion at the Empire exhibition, Glasgow, Scotland.

When engineers finish sheathing the tower in fluted, silver-colored sheets, it will be the highest covered structure in Great Britain. It rests on a foundation containing more than 3200 tons of concrete.

The tower was designed by Thomas S. Tait, architect-in-chief for the exhibition in collaboration with James Mearns, chief designer, Glasgow Steel Roofing Co., which is building the tower.

FINANCIAL

ARMCO REPORTS RECORD SALES, WAGES, TAXES

■ CONSOLIDATED net income for American Rolling Mill Co. and subsidiaries for 1937 was $8,231,335, equal, after all charges, to $2.55 a share on the average number of common shares outstanding. This compares with net income of $6,441,677, or $2.73, in 1936; and with $4,310,130, or $2.41, in 1935.

Sales in 1937 were $114,857,600, establishing a new record for the third consecutive year.

Employment and payrolls also rose to a new high. The number of employes increased from 16,536 at the end of 1936 to an all-time peak of 18,475 in July, 1937, but declined to 16,204 at the end of the year, with the majority of employes working part time. In line with the industry, wages were increased in March, 1937, for the second time within four months, making them approximately 47 per cent above 1929.

Due to the increased rates and larger volume of business, wages and salaries exceeded those of any other year. They amounted to $33,769,160.

Taxes totalled $3,441,609 for 1937, exceeding those of any other year by a wide margin. They equalled $1.20 a share on the average number of common shares outstanding, or about 10 cents for every dollar paid in wages and salaries.

The company increased its holdings in Rustless Iron & Steel Corp. of Baltimore to approximately 47 per cent of the common stock of that company, and, in co-operation with the John Lysaght Co. Ltd., of England, is now planning to organize the Commonwealth Rolling Mills, Proprietary Ltd., in Australia, for the production of specialty iron and steel sheets in that country.

♦

Net earnings of Otis Steel Co., Cleveland, for 1937 amounted to $2,320,031, equal to $1.71 per share of common stock after deducting $5.50 per share on the convertible first preferred stock. This compares with a net profit of $1,980,149 in 1936. All outstanding 7 per cent prior preferred stock has been surrendered under the plan of recapitalization, purchased and retired, or redeemed.

♦

Scullin Steel Co., St. Louis, reports net profit for 1937 amounted to $909,449, equal to $6.18 per share on common stock. In 1936 the company had net profit of $116,175, equal to 30 cents a common share.

♦

Allegheny Steel Co., Brackenridge, Pa., reports net profit of $1,813,707 for 1937, against $1,829,137 in 1936. After providing for dividends on the preferred stock this is equivalent to $2.10 per share on common stock. In 1936, $2.21 per common share was earned.

District Steel Rates

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended April 2	Change	Same week 1937	Same week 1936
Pittsburgh ..	32	+ 2	95	52
Chicago'	32.5	+ 1	84	67.5
Eastern Pa...	29	None	59.5	40.5
Youngstown..	30	+ 1	86	74
Wheeling	41	None	96	76
Cleveland ...	33.5	+ 1.7	79.5	81
Buffalo	30	None	89	62
Birmingham..	66	None	80	69
New England.	20	+ 2	85	72
Cincinnati ...	18	—27	80	55
St. Louis.....	46.5	+ 9.5	82	†
Detroit	18	— 9	100	100
Average....	36	+ 1	91.5	63.5

†Not reported.

Expect Second-Quarter Carloadings To Drop

■ Forecasts of second-quarter carloadings show an anticipated decline in at least six classifications according to figures recently presented before a meeting of the Great Lakes Regional Advisory board in Toledo, O. Included were the following:

	Carloads Actual 1937	Carloads Forecast 1938
Coal and coke	8,556	8,180
Ore and concentrates..	187,943	46,000
Iron and steel.....	59,469	31,281
Machinery and boilers.	5,289	4,628
Autos, trucks, parts...	128,664	66,905
Agric. implements.....	1,514	1,234

Compared with actual carloadings for the same period last year, sharpest drops are predicted in iron and steel, ore and automobiles. Carloadings of coal and coke, machinery and boilers and agricultural implements are expected to be only slightly affected in comparison with the same period in 1937.

Canadian Steel Output Shows Sharp Decline

■ Production of steel ingots and castings in Canada in February was 98,980 tons, compared with 112,380 tons in January and 115,759 tons in February, 1937. For the first two months the total was 211,360 tons compared with 230,996 tons a year ago.

February pig iron production was 61,447 tons, against 74,862 tons in January and 61,995 tons in February last year. Ferroalloys output in February was 4436 tons, compared with 5497 tons in January and 5668 tons in February, 1937. At the end of February six blast furnaces were blowing. 64 per cent of capacity.

PRODUCTION

■ INCREASED steelmaking activity at six centers, sustained production at four others and decreases at the remaining resulted in a gain of 1 point in the national rate last week, to 36 per cent. This is the highest since the second week in November, when the rate was 39 per cent.

Cleveland — Addition of two open hearths lifted operations 1.7 points, to 33.5 per cent.

Youngstown, O. — Rose 1 point to 30 per cent, with 30 open hearths and two bessemer plants active. Schedules for this week indicate a further gain of 3 points, with Youngstown Sheet & Tube bessemer department resuming.

Chicago — Advanced 1 point to 32½ per cent, a rise of 8 points since a month ago and the highest since the second week in November. A small gain is expected this week.

Pittsburgh — Upward revisions by large producers increased the rate 2 points to 32 per cent.

Wheeling — Unchanged at 41 per cent.

Cincinnati — Irregular schedules brought operations last week to 18 per cent, down 27 points.

New England — Up 2 points to 20 per cent, with indications for the same rate this week.

Buffalo — Continued at 30 per cent with expectation of a drop of 4.5 points this week when two open hearths are scheduled to be shut down.

Central eastern seaboard — Improvement in production by some mills was offset by losses in others and the rate remained 29 per cent.

Detroit — With only four of 21 open hearths melting, production dropped 9 points to 18 per cent.

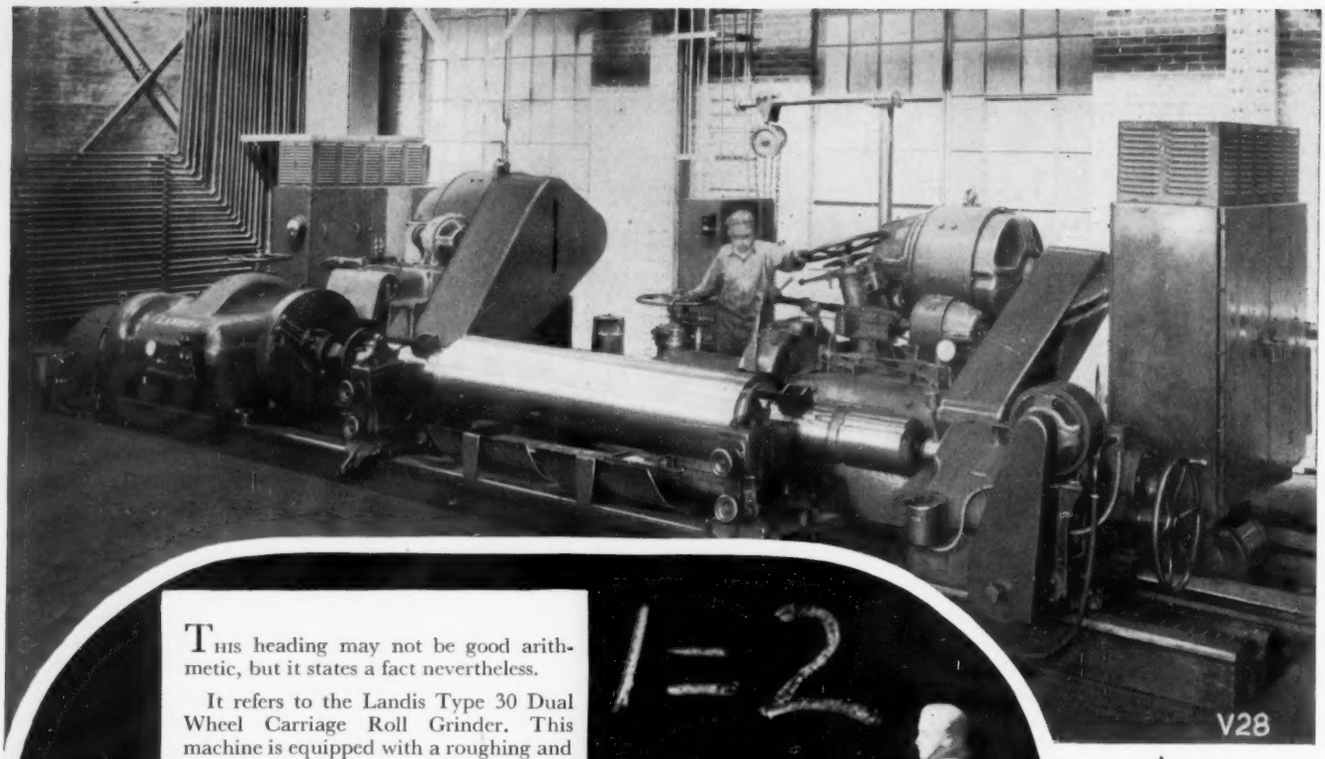
Birmingham, Ala. — Steady at 66 per cent.

St. Louis — Increased 9.5 points, to 46.5 per cent, with an additional open hearth scheduled to go on this week.

Aims Against Cement Basing Point System

■ Procurement division, treasury department, Washington, announced last week that effective immediately it will purchase all cement to be used directly by government departments or agencies. Bidders for cement contracts will be requested to quote on a basis of delivery from place of manufacture.

Officials said this is intended to break up the basing point system used in determining cement prices. It was reported similar regulations may be issued for other building materials, although steel was not mentioned.

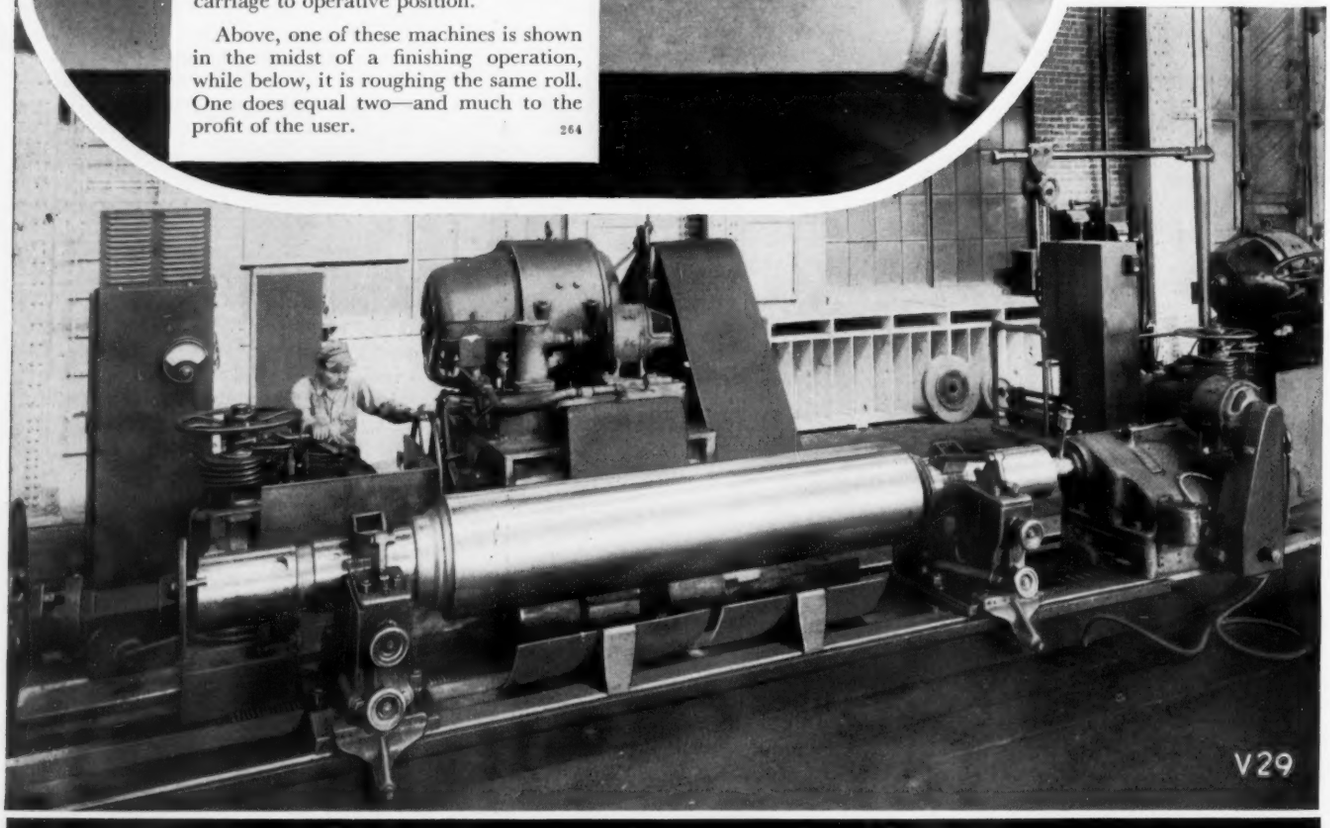


THIS heading may not be good arithmetic, but it states a fact nevertheless.

It refers to the Landis Type 30 Dual Wheel Carriage Roll Grinder. This machine is equipped with a roughing and also a finishing wheel carriage. Think what a simple matter it is to rough a roll with a wheel carriage especially built for that operation and then to finish the roll on the same machine by doing nothing more than moving the roughing carriage out of the way and bringing the finishing carriage to operative position.

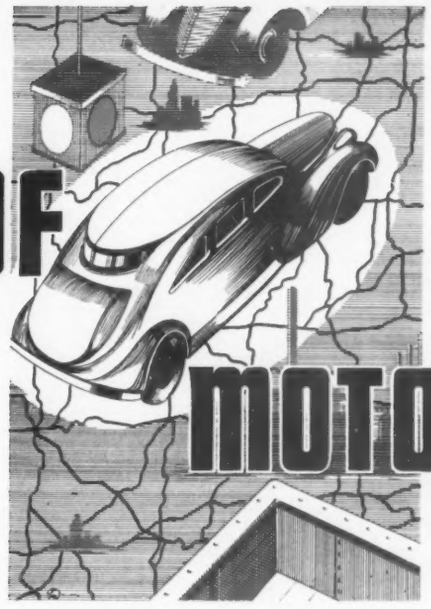
Above, one of these machines is shown in the midst of a finishing operation, while below, it is roughing the same roll. One does equal two—and much to the profit of the user. 264

• PRECISION LANDIS GRINDERS •



LANDIS TOOL COMPANY
WAYNESBORO, PENNSYLVANIA

MIRRORS OF MOTORDOM



DETROIT

■ WHENEVER automobile production hits the skids there is recurrence of talk about the saturation point having been reached in the public's ability to absorb new cars. But each time previously production has moved subsequently to new high levels. With current production on a 2,000,000-cars-per-year plane, many are convinced that on the basis of present population and national income the saturation level of new car buying has been attained and that production this year is suffering to the extent of about 1,500,000 cars as a result of this much overproduction last year, when some 5,000,000 cars and trucks were assembled.

Especially in automobile dealer circles is this belief prevalent. Well-informed observers say the industry can figure now on 3 per cent of the country's 130,000,000 persons buying new cars in a good year, with the average being closer to 2 per cent in a "normal" year. They feel the industry must gear its output on a basis of 2,500,000 passenger cars and about 1,000,000 export and commercial vehicles.

Predict Normal Output in 1939

The low production record being set this year is chiefly the result of abnormally heavy sales pressure exerted on buyers last year, a factor which may explain what is ailing many other lines of business.

Assuming last year borrowed some 40 per cent of the business normally to be expected this year, the only apparent remedy is to mark time until consumption can realign itself to normal demand. There is every reason to believe next year will see a return to normal level.

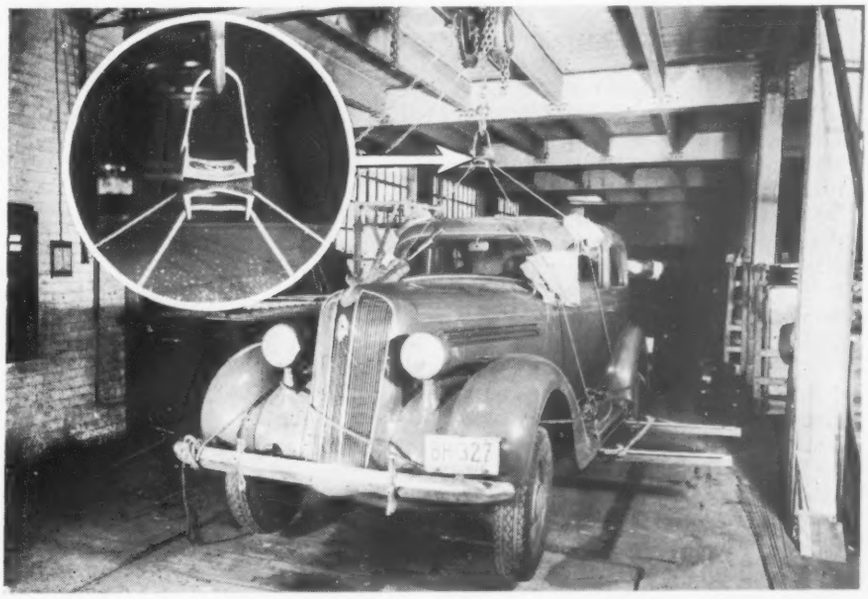
More than one automobile manufacturer is inclined to this viewpoint, and this explains some of the present plans to wind up 1938 production as early as June and

BY A. H. ALLEN
Detroit Editor, STEEL

to concentrate on getting a good start early in the fall on 1939 models. One producer in the medium-price field is understood to be planning only 26 more days' production of 1938 models after April 1.

The national dealers' association in recent months has been flooded with plans for disposing of so-called "junkers" and semiwrecks now in dealers' hands, and out of the welter of suggestions which have been submitted will come a unified proposal to be presented to the national convention of dealers here April 25-27. In shaping up the plan, NADA officials have been guided by the desire to improve highway safety, reduce dealer losses

Demonstrating Ingenious Application of Steel



■ **This automobile, weighing 3025 pounds, has been lifted entirely off the floor, with the supporting device held together only by means of a Tinnerman Speed-Nut, ⅝-inch wide, 1⅜-inch long, .046-inch thick, weighing less than ¼-ounce. The nut is made of 0.70-0.80 carbon, spring steel, heat treated after forming. On several makes of 1938 cars more than 30 of these Speed-Nuts are used in fastening the four fenders. This demonstration indicates the great margin of safety. The U-channels which were drilled to take the ⅝-inch bolt, fastened by the Speed-Nut, are ordinary steel ¼-inch thick, 6 inches wide, 8 inches long, with 2-inch flanges. Both channels were deformed by the weight of the car**

on old vehicles and in general stabilize the retail end of the business. In substance the plan will call for payments by manufacturers for each old car consigned to the scrap heap.

Such an idea is not new, having been sponsored by the Automobile Manufacturers association before the advent of NRA. Originating with the dealer association, the present plan will require the approval and co-operation of the manufacturers to be a success.

Suggestions for removal of the millions of decrepit cars now on the highways have ranged all the way from an outright subsidy by the government, to such other proposals as increasing excise taxes by, say, 3 per cent, using the difference to retire cars beyond a certain age; and another which would place surcharges on license fees depending upon the age of a car, using the extra money to scrap the vehicle when it passed a certain age limit.

Toward Collectivism?

One of the most recent and widely publicized plans to be evolved is that devised by the president of a local steel warehouse interest who would create an "Automobile Salvage Corp." for buying up used cars below $100 in valuation, financed by a suggested 2 per cent contribution from manufacturers, suppliers, distributors and dealers based on respective payrolls, with the further aid of voluntary contributions from labor employed by the above interests, and contributions from automobile products manufacturers. Proponent of the plan foresees a fund of $500,000,000 annually being raised to retire 5,000,000 cars at an average price of $100 each. Cars so purchased would be junked and the scrap sold to mills at scrap prices.

Still another proposal would take the merchandising of used cars entirely out of the hands of dealers and center it in a central organization which would exercise rigid control over trade-in prices and used car resales.

While all of these plans contain some merit, it is the opinion of the dealer association that they tend to restrain free and open competition, introducing elements of collectivism and socialism into the conduct of the business which are felt to be unAmerican and unfair to the principles of free trade.

The mere elimination of 5,000,000 old cars from the roads would not open a market for 5,000,000 new cars, but probably would simply deprive lower income groups of transportation which they are now able to afford. Too, the age of a car is no criterion of its mechanical condition or safety. There are thousands of ten-year old cars today in better shape than similar makes only six or seven years of age. On this score discrimination against the age of a car appears unfair.

It has been suggested that legislation be passed by state governing bodies which would set up minimum mechanical requirements a car would be compelled to meet before it is given access to the roads, thereby automatically condemning many thousands of old vehicles to virtual scrap. Some states have such minimum requirement laws, but they are not general and furthermore, such specifications cannot be too severe or they will meet the intense resistance of organized pressure minorities which exert such powerful influence on legislators.

It will be recalled under former junking plans Ford was one of the leaders in the movement and paid dealers $20 per unit for old vehicles which were stripped of glass and rubber and placed in a huge baling press and squeezed into large bales which could be handled in the 400-ton open hearth at the Rouge plant. This arrangement was abandoned a good many years ago, but the equipment is still available, and there are several sources for the current report that Ford has been buying up a certain number of old cars in the Detroit territory for $12.50 each with the idea of again crushing them up in the baler for melting. At the moment, all open hearths are idle at the Rouge plant; hence it may be a matter of a few weeks before this scrapping program is begun.

A trade practice conference for the automobile industry will be held under the auspices of the federal trade commission in Hotel Statler, Detroit, April 26. All members of the industry have been invited.

Some of the practices suggested for discussion are various forms of misrepresentation, including misleading illustrations; use of fictitious prices and terms of sale; false invoicing; coercion; commercial bribery; finance charge "packing," and price discrimination.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	*227,744
Feb.	300,810	383,900	*202,872
March	438,943	519,022	.....
April	527,625	553,231	.....
May	480,518	540,377	.....
June	469,368	521,153	.....
July	451,206	456,909	.....
Aug.	275,934	405,072	.....
Sept.	139,820	175,630	.....
Oct.	230,049	337,979	.....
Nov.	405,799	376,629	.....
Dec.	518,958	346,886	.....
Year	4,616,274	5,015,974	.....

*Revised.

Week ended	
March 5	54,440
March 12	57,438
March 19	57,555
March 26	56,800
April 2	58,900

	Week ended April 2	Week ended Mar. 26
General Motors	21,930	23,160
Chrysler	14,575	12,225
Ford	14,385	12,060
All others	8,010	9,355

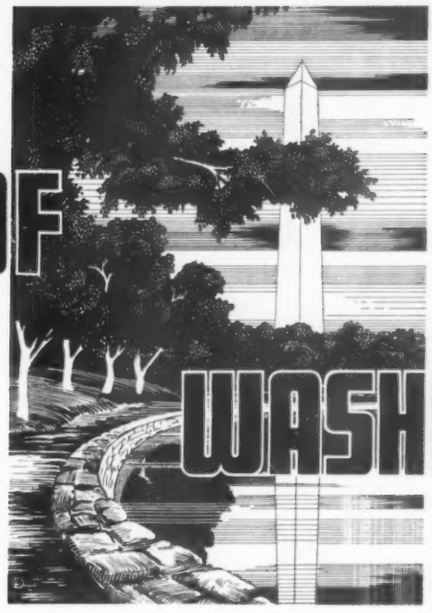
■ LABOR situation has taken a turn for the worse here, following an impasse in negotiations between Chrysler and the UAW for renewal of the union's contract. The corporation proposed to continue the existing contract as it stands, but the UAW offered a number of counter-proposals containing points the corporation said were administrative matters capable of being settled under the present contract.

Since signing the contract last year with the UAW, Chrysler plants have experienced 39 stoppages or slowing down of work ranging from 15 minutes to 3 days, involving the loss of 335,000 hours of work and $318,000 in wages. Further, the record shows 52 occasions of men being beaten up, threatened or coerced, in defiance of contract provisions. District committeemen of the union spent nearly 75,000 hours away from their jobs in handling alleged grievances, and shop committees likewise spent thousands of hours away from their jobs in violation of the agreement entered into last April 14.

In spite of this sad experience, the corporation has indicated its willingness to give the plan another year's trial in the effort to make it work, but the UAW rejected the proposal and is now seeking additional privileges. Privately union leaders know they will not be accorded their broader demands, but it is an old union policy to ask for everything within sight and then be satisfied with a few concessions.

Violence broke out several times at the plant of the Federal Screw Works here last week as the company continued operations in face of massed defiance by 300-600 UAW pickets largely recruited from other plants. Forced to make wage cuts as a result of attempts to meet the competition of products made outside Detroit at lower wage rates, the company immediately encountered resistance from the UAW, but declared that work was available to all who wanted it.

WINDOWS OF WASHINGTON



WASHINGTON

■ INDICATIONS are the new tax bill will be written in conference between the two houses, and probably will be more or less of a compromise. It is impossible to predict accurately what manner of law will result.

Finance committee of the senate, which has been considering the bill, has decided to report it back to the senate the week of April 4, with major changes from the house draft. The bill passing the senate probably will be much more lenient to business than that enacted by the lower body.

A substantial majority of the senate finance committee materially changed many of the important provisions, along decidedly liberal lines.

Last week Senator Walsh, Massachusetts, an influential member of the finance committee, said: "The two provisions of the present revenue law that have provoked more protests and are alleged to have occasioned more injury to business than any other taxes in our history, are the undistributed profits tax and the capital gains levies. The house declined to repeal the undistributed profits tax, but voted a modification, retaining the principles.

Flat Tax on Profits

"The senate finance committee has already voted to eliminate the house proposal and will provide in its bill for complete repeal of the principle of the undistributed profits tax, and instead place an increased flat tax (18 per cent) on all corporation net earnings.

"The senate finance committee has also made a radical change in the tax on capital gains, substituting a flat rate of 15 per cent instead of treating capital gains as ordinary income, as is done in the existing law and in the house bill.

"When capital gains are taxable as ordinary income, the result is

BY L. M. LAMM

Washington Editor, STEEL

a graduated rate rising higher in accordance with the total income of the particular individual. The result has been to 'freeze' many investments when a large profit would result from a sale, because so large a percentage of the resulting profit would be taken in taxes.

"The important changes that the senate finance committee is recommending on undistributed profits and capital gains taxes will remove some of the burdens these tax provisions have inflicted upon many corporations. However, the changes by the senate committee do not reduce the tax burdens of corporations. As a matter of fact the flat tax increase on corporations will increase the taxes on all corporations more than $100,000,000.

Processing Impost Rejected

"The finance committee has also taken a liberal viewpoint on controversial questions with respect to estate taxes and gift taxes.

"The committee has rejected the proposal to add processing taxes on farm products to the present bill. In my opinion it is no time to further increase the cost of living by placing additional taxes on food and clothing.

"The committee has rejected the suggestion that we attach to the bill a plan for 'taking the profit out of war' by enacting in advance a high rate tax schedule to take effect in case of war. Whatever may be said for the merits of this plan, it obviously invites much controversy and should not be injected into the present and immediate problem of effectuating proper revision of existing peacetime taxes.

"With respect to the question of broadening the income tax base by lowering present exemptions, I believe it is unlikely that congress will be disposed to accept such a proposal this year, though, in my opinion, it is only a matter of time before this will be done.

"It is now apparent that there will be substantial differences in the tax principles contained in the house and senate bills. This means these differences will have to be 'thrashed out' in conference between committees of the house and senate."

MOUNTING TAX BURDEN HANDICAP TO BUSINESS

In view of the pending tax bill, the United States Chamber of Commerce has made an extensive study of the tax situation and points out that the nation's tax load is increasing at a startling rate. It has gone up 30 per cent in the last two years and is still rising. The chamber has the following to say:

"The figures are disturbing. In the current fiscal year, it is estimated, the country's tax collectors, federal, state and local, will dip into the national purse to the extent of 13.5 billion dollars. Two years ago the total tax was 10.4 billion dollars.

"This year's staggering tax burden is more than the entire nation's food bill.

"It represents at least one-fifth of the national income, a dangerously high percentage. In other words, more than 20 cents out of every earned dollar goes to defray the cost of government. Ten years ago the ratio was 12 cents out of every dollar.

"Obviously, the mounting tax burden has imposed restraints and handicaps upon business enterprise and has thus contributed importantly to the current slump. There is ample evidence on this point.

"For example, a large industrial enterprise recently explained that the increased taxes it had paid since 1935 would be sufficient to employ

6500 additional workers for one year. The corporation's taxes in that period increased 600 per cent.

"Another concern, medium-sized, informed the chamber that it pays taxes equivalent to $1.15 each working day for each wage earner on the payroll.

"Scores of other convincing illustrations might be cited showing how the increasing volume of taxes adversely affects business development, employment and payrolls."

SENATE SCRAP HEARINGS THIS WEEK; TO BE BRIEF

The subcommittee of the senate military affairs committee is ready for the hearing to be held April 5 on various bills referred to it prohibiting the export of iron and steel scrap, except under government license.

Few witnesses will be heard and it is believed the hearings will not last more than a day or two. Louis J. Brann, former governor of Maine, who is handling this case for the independent iron and steel producers committee on scrap, and Benjamin Schwartz, representing the Institute of Scrap Iron and Steel Inc., have notified the committee they will file briefs and put only one witness on the stand. The committee has not been notified what witness will testify for these two interests. It is possible that members of congress who are interested may be heard.

RAILROAD STEEL BUYING INCREASED IN 1937

The Association of American Railroads last week announced that Class I railroads in 1937, purchased iron and steel products amounting to $359,409,000, compared with $273,753,000 in 1936, or an increase of $85,656,000. The largest item is locomotive and car castings, beams, couplers, frames and car roofs, for which $62,373,000 was spent in 1937, compared with $45,183,000 in the preceding year. Purchases of steel rail, including new and second-hand, except scrap, amounted to $44,424,000 in 1937, compared with $37,239,000 in the preceding year, while for track fastenings, track bolts, spikes, and other materials used in connection with the laying of rails, the railroads expended $36,558,000, which was an increase of $5,352,000.

For wheels, axles and tires, the railroads expended $31,173,000, compared with $24,501,000, while for bar iron and steel, spring steel, tool steel, unfabricated rolled shapes, wire netting and chain, boiler, firebox, tank and sheet iron and steel, their expenditures amounted to $32,186,000 compared with $24,901,000. Purchases of interlocking and signal material in 1937 totaled $15,463,000, and for standard and special mechanical appliances for locomotives, $13,603,000.

Among other commodities purchased by the railroads in 1937 they spent $4,642,000 on forging and pressed steel parts for locomotives compared with $3,103,000 in 1936. Car forgings of iron and steel, and fabricated or shaped steel for passenger and freight cars purchased in 1937 amounted to $18,042,000 compared with $11,072,000 in 1936. Flues and tubes for locomotives and stationary boilers in 1937 amounted to $5,999,000 compared with $5,504,000 in 1936. In 1937 they spent $4,133,000 for iron bridges, turntables and structural steel of all kinds, compared with $3,782,000 in 1936.

Purchases of bolts, nuts, washers, rivets, lag screws, pins and studs in 1937 amounted to $12,417,000 compared with $10,505,000 in 1936. Springs, helical and elliptical of all kinds for locomotives and cars purchased in 1937 amounted to $3,868,000 compared with $3,228,000 the preceding year. In 1937 the purchase of track and roadway tools, all kinds, miscellaneous track material and wire fencing, motor, hand, push and velocipede cars, and parts for same amounted to $7,809,000, compared with $5,716,000 for 1936.

Buy Much Machinery

In 1937 they spent $5,405,000 for machinery and repair parts, including all power driven shop machinery compared with $3,107,000 spent in the preceding year. Machinery, boilers, repair parts and all other iron and steel products in 1937 amounted to $9,711,000, compared with $6,550,000 in 1936. The purchase of pipe, iron and steel, and fittings of all kinds amount to $6,663,000 in 1937, compared with $5,519,000 in 1936. Hand and small machine tools, such as drills, taps, reamers, dies, chasers, including air tools and parts purchased in 1937 amounted to $9,034,000, compared with $6,483,000 spent in 1936.

The railroads spent $13,603,000 for standard and special mechanical appliances for locomotives in 1937, compared with $10,573,000 the preceding year. Automotive equipment and supplies in 1937 cost $5,078,000, compared with $3,915,000 spent in 1936, and in 1937 the purchase of frogs, switches, and crossings, and parts of same amounted to $12,566,000 compared with $8,192,000 in 1936.

PRESENT ARGUMENTS ON CANADIAN TRADE PACT

The committee for reciprocity information will hold hearings this week in connection with the pending trade agreement with Canada. Representative Case, South Dakota, will discuss manganese.

The calendar shows that arguments on iron and steel chain will be presented by the Chain Institute Inc.; aluminum scrap and alloys, Fairmont Aluminum Co., Fairmont, W. Va.; aluminum, aluminum scrap and alloys, Reynolds Metals Co., Richmond, Va.; aluminum, National Smelting Co., Cleveland; and ferrosilicon, ferromanganese by the Electro Metallurgical Co., New York, and Vanadium Corp. of America, New York.

SOVIET PURCHASES DOUBLE ITS AGREED VOLUME

Figures available at the department of commerce show that total exports to Soviet Russia in 1937 were valued at $42,903,000, an increase of 28 per cent over 1936.

Metals and manufactures accounted for $13,747,000, the largest items being iron and steel sheets and plates, tin plate, ferroalloys, car wheels, strip steel, boiler tubes, and copper. Machinery and vehicles made up an even larger total, $20,195,000. Outstanding items were aircraft and parts, metal-working machinery (chiefly machine tools), oil well and refinery machinery. These four items totaled $14,839,000, or 73 per cent of the value of machinery and vehicles. Automobiles and parts, in previous years an important item, have dropped to $409,000.

D. A. Rosoff, chairman, Amtorg Trading Corp., New York, representative of the Soviet government, last week stated that the soviets in 1937 placed orders for $75,000,000 worth of goods in the United States. Its agreement for the year 1937-38 called for purchases of $40,000,000, actual orders being almost double the guarantee. Deliveries were not entirely completed during 1937, which accounts for the variation from the department of commerce figures.

SENATE ADDS TO NAVAL CONSTRUCTION PROGRAM

The senate last week passed the regular naval appropriation bill which has already been passed by the house and goes to conference.

The senate increased by $1,500,000 the appropriation for certain ship constructions. As the bill passed the house, provision was made for two battleships, two cruisers, eight destroyers, six submarines and for the commencement of one mine-sweep, one submarine tender, one fleet tug, and one oiler, for which $117,363,150 was appropriated. The senate raised this to $119,900,000. As the bill passed both house a special appropriation of $200,000 was made available, effective July 1, this year, for replacement of machinery and tools at the naval torpedo station, Newport, R. I., and $20,700,000 for armor or armament and ammunition.

RASTALL TO TARIFF BOARD

W. H. Rastall, for more than 15 years chief of the machinery division of the department of commerce, last week went with the United States tariff commission. He will have charge of the machinery work in the metals division.

Broader Research in Alloys of Iron Has Firm Foundation in Work Already Done

■ IRON ALLOYS committee of the Engineering Foundation reports as 70 per cent complete the "alloys of iron research" initiated early in 1930 as a 5-year project. In the intervening eight years a great deal of useful work has been accomplished. The literature on iron alloys published throughout the world from 1890 to 1937 has been reviewed and condensed in 17,000 abstracts on file at the committee's headquarters in New York. A number of brochures covering nickel, vanadium, silicon and other iron alloys have been published.

The committee now recommends that the alloys of iron research be amplified and established on a permanent basis. It calls for a survey of colleges where metallurgical research work is carried on and for the endowment of fellowships in those colleges. The purpose is the acquisition of knowledge about alloys steels and cast irons that now is lacking.

"Work so far accomplished," says Prof. George B. Waterhouse, chairman, "has shown clearly that metallurgical research has been insufficient to clear up all uncertainties in our knowledge of alloy steels and cast irons. Much of the past research has been unsystematic. So sketchy is our knowledge of some of the alloy systems that they are mostly gaps.

Fundamental Data Give Valuable Aid in Specific Investigations

"Filling the various gaps now present is of utmost importance not only because it will add to our knowledge of scientific fundamentals but because it will aid greatly in systematizing industrial research and in eliminating many of the costly, hit-or-miss investigations now so common. Furthermore, basic research, directly or through its many by-products, may lead, as in the past, to developments of vast commercial importance."

Many producers and consumers of steels and cast irons are fully awake to the importance of research work and are conducting such activities in an impressive manner. In most cases this work is aimed at specific objectives, precluding the desired breadth of approach. It is logical to assume that many research projects could be conducted more effectively if supplemented by the comprehensive program visualized by the iron alloys committee. Aimed at the acquisition of knowledge to fill existing gaps, this research plan could be expected to make available data of a fundamental character which the typical research worker, concerned with one or more specific problems, would find helpful.

Fellowships Would Intensify Alloy Development and Progress

As to the future of alloy steels and cast irons there is no doubt. They are being used increasingly in large numbers of applications where high strength, toughness, special magnetic properties, corrosion resistance, heat resistance and other properties are required. Potentialities in the development of new or improved alloys are illustrated by the widespread adoption of stainless steels and, more recently, of low-alloy steels which permit reduction of weight without sacrifice of strength.

Establishment of research fellowships along the broad lines contemplated by the iron alloys committee undoubtedly would bring an intensification and co-operation of research work that would materially hasten future progress in alloy development. The plan should have thoughtful consideration and support both from producers and consumers of such alloys.

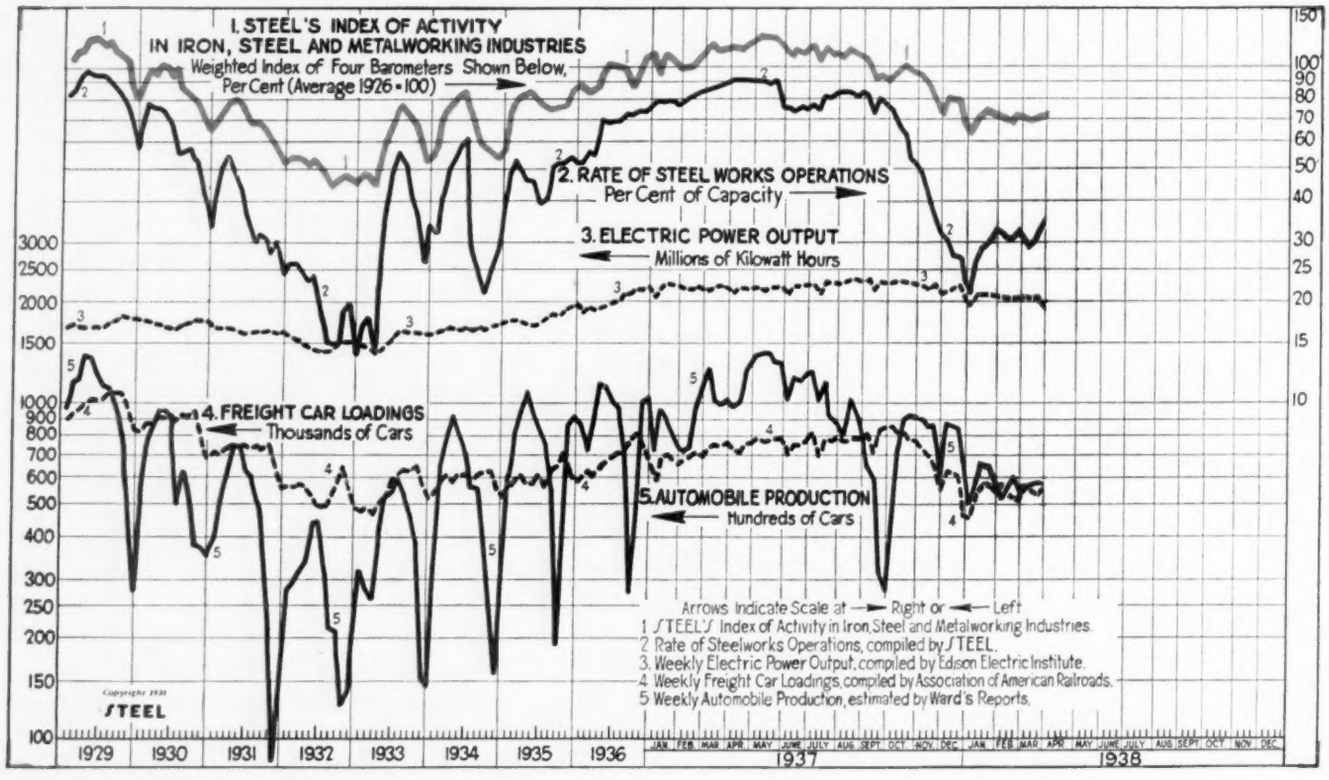
Index of Industrial Activity Shows Seasonal Gain

■ AT the beginning of the second quarter, industrialists are debating the questions of the extent of the present moderate seasonal bulge and the timing of the probable summer easing of activity in the iron, steel and metalworking field. Observers who believe that the stock market is a forecaster of industrial events are somewhat pessimistic over the prospect for the summer months.

However, substantial gains in two of four barometers lifted STEEL's index of activity to 72.0 per cent for the week ended March 26. This represents the third consecutive advance of this index, thereby regaining all the ground lost during February and coming within 2.7 points of equaling the high for this year of 74.7 reached on Jan. 22.

The gain of 0.7 points in STEEL's index for the week ended March 26 was accounted for principally by the continued upward movement in steelmaking operations to 35 per cent. This important barometer broke into new high ground for this year and represents the highest rate this industry has operated since the week ended Nov. 20, 1937. Automobile production continues to fluctuate between the 50,000 to 60,000 per week mark. Total for the week ending March 26 was 56,800 cars, a contra-seasonal decline from 57,555 cars in the previous week.

Power production for the week ended March 26 was 1,975,239,000 kilowatt-hours, breaking through the 2,000,000,000 kilowatt-hour level for the first time since the week ended Jan. 1. This represents a decline of approximately 10 per cent from 2,200,143,000 kilowatt-hours in the same week last year. Car loadings are expected to exceed 555,000, a substantial gain over the 540,332 cars loaded in the preceding week.


1. STEEL'S INDEX OF ACTIVITY IN IRON, STEEL AND METALWORKING INDUSTRIES
Weighted Index of Four Barometers Shown Below, Per Cent (Average 1926 • 100)
2. RATE OF STEEL WORKS OPERATIONS
Per Cent of Capacity
3. ELECTRIC POWER OUTPUT
Millions of Kilowatt Hours
4. FREIGHT CAR LOADINGS
Thousands of Cars
5. AUTOMOBILE PRODUCTION
Hundreds of Cars
Arrows Indicate Scale at → Right or ← Left
1 STEEL'S Index of Activity in Iron, Steel and Metalworking Industries.
2 Rate of Steelworks Operations, compiled by STEEL.
3. Weekly Electric Power Output, compiled by Edison Electric Institute.
4 Weekly Freight Car Loadings, compiled by Association of American Railroads.
5 Weekly Automobile Production, estimated by Ward's Reports.
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1929 1930 1931 1932 1933 1934 1935 1936
1937
1938

STEEL'S index of activity gained 0.7 points to 72.0 in the week ending March 26:

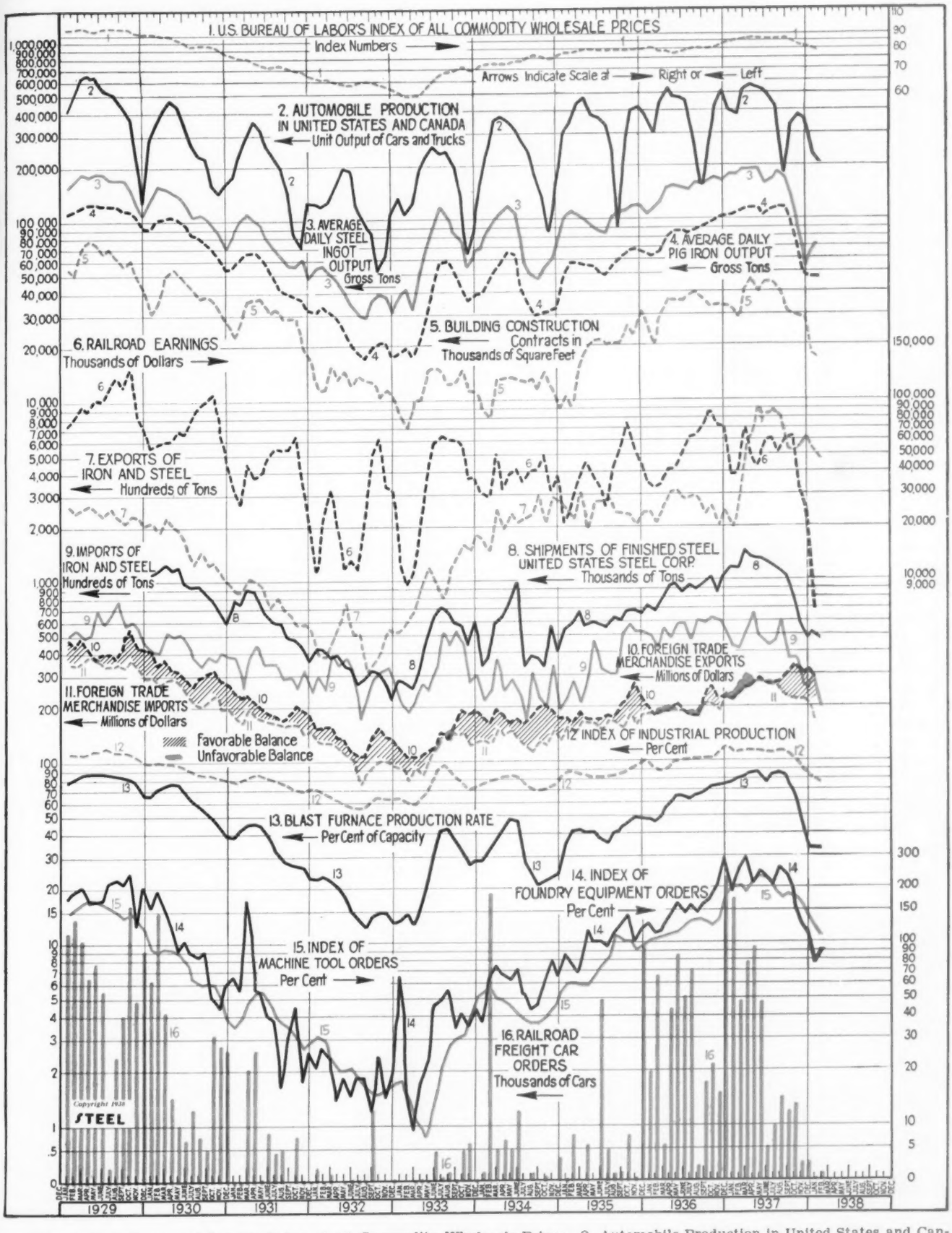
Week ending	STEEL's Index of Activity Index No. 1937	1936	Steelworks Operating Rate Per Cent 1937	1936	Electric Power Output Million KWH 1937	1936	Freight Car Loadings 1937	1936	Weekly Auto Output 1937	1936
Dec. 25	69.5	93.3	23.0	68.0	2,085	2,080	460,367	562,218	67,230	79,019
	1938	**1937**	**1938**	**1937**	**1938**	**1937**	**1938**	**1937**	**1938**	**1937**
Jan. 1	62.7	96.6	21.0	79.0	1,998	2,069	457,359	587,958	49,550	71,800
Jan. 8	70.1	107.8	26.0	79.5	2,139	2,244	552,314	698,529	54,084	96,780
Jan. 15	74.4	106.7	29.0	79.0	2,115	2,264	580,600	700,238	65,735	91,685
Jan. 22	74.7	104.0	30.5	80.0	2,108	2,256	570,333	670,376	65,418	81,395
Jan. 29	73.8	99.6	33.0	76.0	2,098	2,214	553,176	659,790	59,365	74,148
Feb. 5	70.9	100.8	31.0	79.5	2,082	2,201	564,740	675,026	51,443	72,295
Feb. 12	71.2	101.9	30.0	81.0	2,052	2,199	542,991	691,618	57,810	72,850
Feb. 19	71.9	108.8	31.0	83.0	2,059	2,211	535,790	714,884	59,100	95,698
Feb. 26	70.3	112.8	30.5	84.0	2,031	2,207	511,930	696,727	56,977	111,915
Mar. 5	70.1	117.9	29.5	86.0	2,035	2,199	552,916	734,127	54,440	126,975
Mar. 12	70.8	112.7	30.0	87.0	2,014	2,212	556,664	748,993	57,438	101,684
Mar. 19	71.3†	113.1	32.0	89.0	2,017	2,211	540,332†	759,269	57,555	99,013
Mar. 26	72.0*	114.0	35.0	90.0	1,975	2,200	555,000*	761,109	56,800	101,046

*Preliminary. †Revised.

STREND

Key:	Feb. 1938	Key:	Feb. 1938	Key:	Feb. 1938	Key:	Feb. 1938
1	79.7	5	18,903,000	9	19,589	13	33.6
2	202,872	6	6,919,879	10	289,437,000†	14	90.4
3	70,969	7	460,640	11	170,763,000†	15	112.3
4	46,655	8	474,723	12	79	16	109

†January.



Key: 1. U. S. Bureau of Labor's Index of all Commodity Wholesale Prices. 2. Automobile Production in United States and Canada, compiled by U. S. Department of Commerce. 3. Average Daily Steel Ingot Output, compiled by American Iron and Steel Institute. 4. Average Daily Pig Iron Output, compiled by STEEL. 5. Building Construction, Contract Awards in 37 States, compiled by F. W. Dodge Corp. 6. Railroad Earnings, Net Operating Income for Class I Roads, compiled by Bureau of Railroad Economics. 7 and 9. Iron and Steel Foreign Trade, reported by Bureau of Foreign and Domestic Commerce. 8. Shipments of Finished Steel, United States Steel Corp. 10 and 11. Foreign Trade, Value of Exports and Imports, reported by Bureau of Foreign and Domestic Commerce. 12. Index of Industrial Production (adjusted for seasonal variation; average 1923-25=100) computed by Federal Reserve Board. 13. Blast Furnace Production Rate, compiled by STEEL. 14. Index of Foundry Equipment Orders (Average 1922-24=100), compiled by American Foundry Equipment association. 15. Index of Machine Tool Orders (Three-month moving average; average monthly shipments 1926=100), compiled by National Machine Tool Builders association. 16. Railroad Freight Car Orders, compiled by STEEL.

By E. T. COBB
Bantam Bearings Corp.
South Bend, Ind.

Accuracy In...

New standards of accuracy have become necessary as bearings are being made larger for equipment in wide strip mills. At the plant of the Bantam Bearings Corp. accuracy is based on the 80-inch measuring machine and methods herein described

■ ACCURACY in antifriction bearings is of prime importance. As bearings became larger for such equipment as wide strip mills shown in Fig. 1, new standards of accuracy became necessary. Through years of experience, special methods have been developed for holding diameters up to 35 inches to within 0.001-inch, and up to 60 inches within 0.002-inch.

Achievement of such a degree of accuracy is based upon absolutely dependable means for measuring up to the maximum dimension of the largest work under controlled temperature and upon careful control of each contributing factor from the uniformity of structure of the raw material to the assembly and final inspection of the product.

Accuracy of large measurements maintained by the Bantam Bearings Corp., South Bend, Ind., is based upon the 80-inch measuring machine shown in Fig. 3. This machine measures directly up to 80 inches in increments of 0.00001-inch and is periodically checked against Johansen blocks and special long gage pins reserved for this purpose exclusively. The machine is used in keeping master gages up to the closest possible degree of accuracy at all times. For angular measurements a special sine bar rapidly measures angles between 0 and 180 degrees to an accuracy of 12 seconds.

In measuring the larger bearings, temperature is a major consideration, and all measurements are standardized at 68 degrees Fahr. A thermometer is used in connection with all measurements made in the gage room. Gages are made of the same material as the race to be checked in order to avoid differences in coefficients of expansion, and these gages are maintained at the same temperature as the work to be checked by keeping the workman's gage in the liquid coolant during grinding operations.

Although Bantam bearings are manufactured in small sizes, only the large sizes of heavy-duty bearings, ranging from 37 to 60 inches outside diameter are considered in this treatise. The weight of the assembled bearing is from 1 to 4 tons, and the internal diameters, which serve as the races for the rollers where the highest degree of accuracy is required, are from 35 to 45 inches. Some of the factors entering into the accuracy of these bearings, from the raw material to the finished product, follow.

The raw material used for all bearings of this type is SAE 52100 electric furnace alloy steel, which is manufactured almost exclusively and in large tonnages for use in balls, ball bearing races, roller bearings, and other parts requiring

Fig. 1—Typical installation of steel rolling mills in which large roller bearings of the types under consideration are used

Roller Bearings

Large

Fig. 2—A large ball thrust bearing, 36-inch inside diameter x 42-inch outside diameter x 3 inches thick, with thin cross section. This type work introduces unusual problems in heat treating

high hardness and resistance to shock. This steel is of the high-carbon-chromium type for deep hardening, and with proper heat treatment is fully controllable as to exterior and interior structure, thus producing the highest-crushing resistance. The metal is bought on close specifications of analysis, grain size, cleanliness and microstructure.

A percentage inspection is made of all incoming stock for size, surface, hardness, grain size, and metallurgical structure. The percentage of material inspected varies with the product. Any appreciable deviation from specifications causes a recheck, with consequent acceptance or rejection, and a stiffer inspection of all immediate subsequent shipments received from the same source.

Forgings, the chief source of all of the larger races, are usually rolled, pressed or hammered. While there has been much discussion as to the merits of each method, service records indicate no noticeable preference, and consequently the method of preparing forgings is largely dependent upon the question of manufacturing economy. A minimum of ⅛-inch must be allowed for removal from all surfaces to insure complete removal of scale, surface decarburization, and other surface imperfections brought about by the forging process. Forgings must be reasonably round, concentric and square of axis. Although excessive metal left on the forging does not hinder or aid metallurgically, it naturally increases the cost due to the extra machining involved and extra waste of material.

To secure forgings thus properly sized and shaped, the forge shop must be supplied with clean, sound, homogeneous billets of good surface and of weights (or exact multiples thereof) close to the weights of the rings to be formed, including allowance for center discard. This center discard is a slug punched from the billet to remove any possible traces of center segregation. These billets must be made and processed under rigid alloy practice by a reputable mill with ample experience in producing bearing quality steel.

Subsequent to forging, all rings are given a special normalizing and annealing treatment to produce a structure mainly spheroidized but containing a definite percentage of lamellar constituent. This structure is constantly checked by random selection of forgings from all suppliers. During machining a ring ¼-inch wide by ½-inch thick is cut around the circumference of the forging from as deep within the forging as design and stock tolerances will permit. See Fig. 4. These rings are carefully examined macroscopically and microscopically for comparison with acceptance standards on grain size, cleanliness, uniformity of anneal and carbide distribution.

For the smaller size bearings seamless tubing is used for races rather than forgings. The specifications are similar in all details, the difference being merely a matter of convenience of manufacture.

Factors contributing toward the accuracy of machining are the skill of the individual operator and the provision and proper maintenance of sturdy machines of ample size for this heavy type work. The skill of the operator is perhaps the most important factor. However, large and sturdy machines must be provided for this class of work and they must be kept in an accurate state of repair and adjustment. Machining operations are held to within 0.005-inch on all diameters. An individual record is kept of exact size of each job when machined for comparison with size after heat treatment. This is done to record the amount of warpage and size

change which occurs during heat treatment, and records are used to control the amount of grinding stock on subsequent work.

Fig. 2 illustrates a race of large diameter and thin section, and on these races it is necessary to rough machine, then anneal to eliminate machining stresses before finish machining. This is made necessary by the tendency of a thin race of large diameter to warp during the heat treatment. On races of medium to heavy section, an intermediate anneal between the two machining operations is not required.

The method used for obtaining the proper degree of hardness without making these parts brittle is called differential hardening. This method was developed by Bantam after many years of careful correlation of various methods with service life. Steel of high-carbon content throughout is preheated and quenched by special processes which produce a uniform surface hardness of about 60 Rockwell "C" which gradually decreases toward the interior of the steel, with no definite line of demarcation between hardened and unhardened material. Wear resistance as well as shock resistance is assured. Steel hardened in this way will take a considerable amount of bend without breaking.

The heat treating procedure is specified by the metallurgical laboratory. Special notes of unusual features of design or service are supplied to the metallurgical laboratory by the engineering department. The unusual success of Bantam in producing accurately and uniformly heat treated bearing races is due primarily to:

1. Accurate size and finish of machined parts.
2. Well-established methods for accurate heating. This is accomplished in modern electric furnaces with continuous automatic temperature control to within close limits.
3. Special processes to secure selective hardening or to produce uniform hardening in races of wide varying cross sections. In order to secure uniform surface hardness without undue brittleness of the thin sections, such as thrust lips, special provision is made to avoid overheating the thinner sections during preheating. Further provision is made in quenching for "differential cooling" whereby thin sections are cooled at virtually the same rate as adjacent heavy sections.
4. All quenching is done with stopwatch accuracy to insure constant uniform results.
5. After quenching, all rings are drawn immediately in electrically-heated recirculating type of hot air furnaces, with continuous automatic temperature control within close limits. Fig. 6 shows the type of electric pit hardening furnaces used.

Fig. 3—An 80-inch measuring machine. This unit measures up to 80 inches in increments of 0.00001-inch

Rings Carefully Checked

Before release from the heat treating department, all rings are carefully checked for size, hardness and shape. Races are machined to within a close degree of accuracy, allowing minimum but ample metal for removal during the grinding operation so as to insure the proper hardness, texture and other conditions of the finished surface. It is therefore necessary to prevent undue warpage during the heat treatment, if the proper finished condition is to be had in the final product. A thorough check is made at this time to insure that a suitable job is turned over to the grinding department, and accurate records are kept which serve as a basis of future treatments and of machined sizes. In this way advantage is taken of all movements of the metal in heat treatment to reduce grinding stock to the small amounts desired. Movement is predicted on new orders on the basis of the records of movements in past jobs.

The race goes to the grinders without noticeable warpage and in approximately its final form, except for a thin layer of metal on all surfaces, which is to be removed in the grinding operation. The thickness of this layer of metal to be ground off is fixed through experience to give a finished surface, which is properly hardened, uniform, smooth and with all decarburization removed.

Grinding Is Problem

Internal and external grinding of roller bearing races to a high degree of accuracy of size and concentricity introduces an unusual grinding problem. When exterior metal is removed from hardened steel, warpage takes place. Usual holding methods for grinding are constituted of means which either prevent this warpage from taking place during grinding, thus leaving

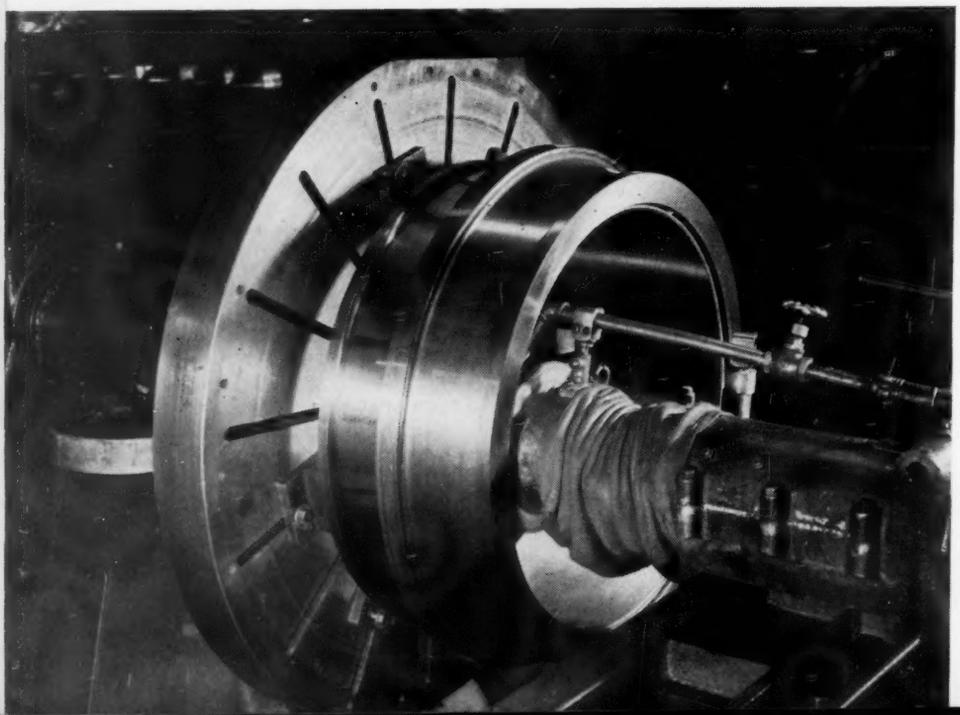


Fig. 4—A large taper roller bearing inner race, or cone, fastened to the face plate of the grinder by lugs. Note provision for grinding all diameters on a single setup, thus insuring absolute concentricity. Also note provision for releasing work to permit adjustment of stresses in the steel between preliminary and finish grinding operations without removing work entirely from machine

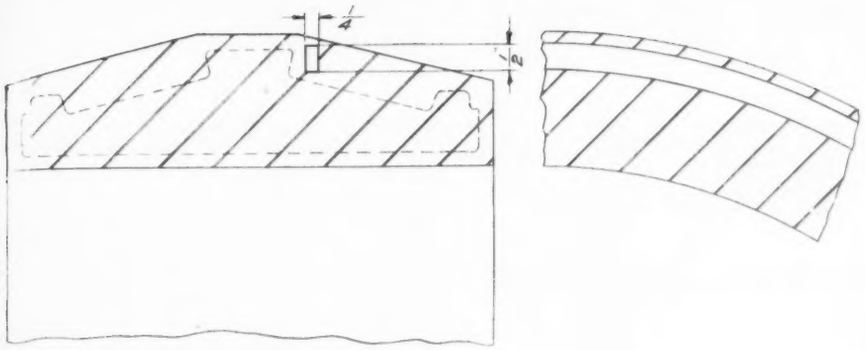


Fig. 5—A ring from the forging is taken for test purposes to assure proper quality and uniformity of the steel used in bearing large races

the finished race misshaped, or the warpage is relieved when obstructing clamps are changed from the inside of the race to the outside or vice versa. This results in an eccentric finished race. Bantam has devised a method, covered by letters patent, overcoming these problems and insuring concentricity, roundness, and accuracy of dimension as shown in Fig. 4.

Each race is Blanchard ground on the sides; the clamps are fastened to one side by metallic fusion and Blanchard ground to perfect flatness. Then the race is mounted for grinding by bolting the race clamps to the face plate of the grinding machine, as shown in Fig. 4. The clamps are so arranged that the inside diameter and outside diameter of the race are entirely unobstructed at all times and are ground across their entire width without changing the setup. The outside diameter is first rough ground, then the inside diameter and finally finished by a series of successive grinding operations.

Returned for Redrawing

In the case of large races of small cross section, such as those shown in Fig. 2, the work is returned to the heat treating department for redrawing (relief of grinding stresses and any residual heat treating stresses) before the final grinding operation.

Grinding both diameters at the same setting produces uniform wall thickness which is the essence of concentricity. The race is also free to adjust itself to any warpage which occurs. Adjustment is further aided by slightly relieving the tension of the clamp bolts after each successive grinding operation. This freedom of the race to expand or contract during grinding insures concentricity and roundness obtainable by no other means and also allows dimensional tolerances to be accurately held, these usually being about one-half of those possible by other methods.

Heavy machines, free of bearing looseness, with all rotating parts accurately balanced and kept in close adjustment are used for this work. Even so, only the highest class of skilled workman is capable of producing work to the unusually close tolerances required here. These special grinders are designed with Bantam antifriction bearings in the headstock, which enable the operator to turn the work spindle by hand for accurately centering the work, although the weight of individual races is as much as 3000 pounds. The work and grinding spindles of these machines are horizontal. See Fig. 4. The weight of the rotating parts thus keeps the bearings in close contact under load and prevents looseness. By these methods it is possible to hold these large races round within 0.0002-inch and concentric within less than 0.0002-inch.

Soft free-cutting wheels are used on this type of work to prevent burning the surface of the steel, although the expense from the standpoint of wheel life and rate of progress on the work is more than would be the case if a harder wheel were used. The grinding surface of the wheel is kept accurately dressed and free from surface deformation.

During grinding, several checks are made for hardness to insure uniformity and to reject any defective parts as quickly as possible. All surfaces on which the rollers are to operate are polished or lapped to remove small scratches and any other imperfection remaining after the finish grinding operation.

Given Same Hardness

Rollers for these bearings are made of bar stock of the same material as that used in the races and are given the same hardness. The machining heat treatment and finish grinding and polishing of the rollers are done with the same degree of care as that mentioned for the races. All rollers, regardless of size, must be of the required surface hardness (about 60 Rockwell "C" scale) and at the same time be capable of taking a bend without breaking. Rollers, which will not take a permanent set after heat treatment and finish grinding, are considered as too brittle for use in these heavy duty bearings. Where the ratio of diameter to length permits, representative samples of rollers from each heat are given a

(*Please turn to Page* 78)

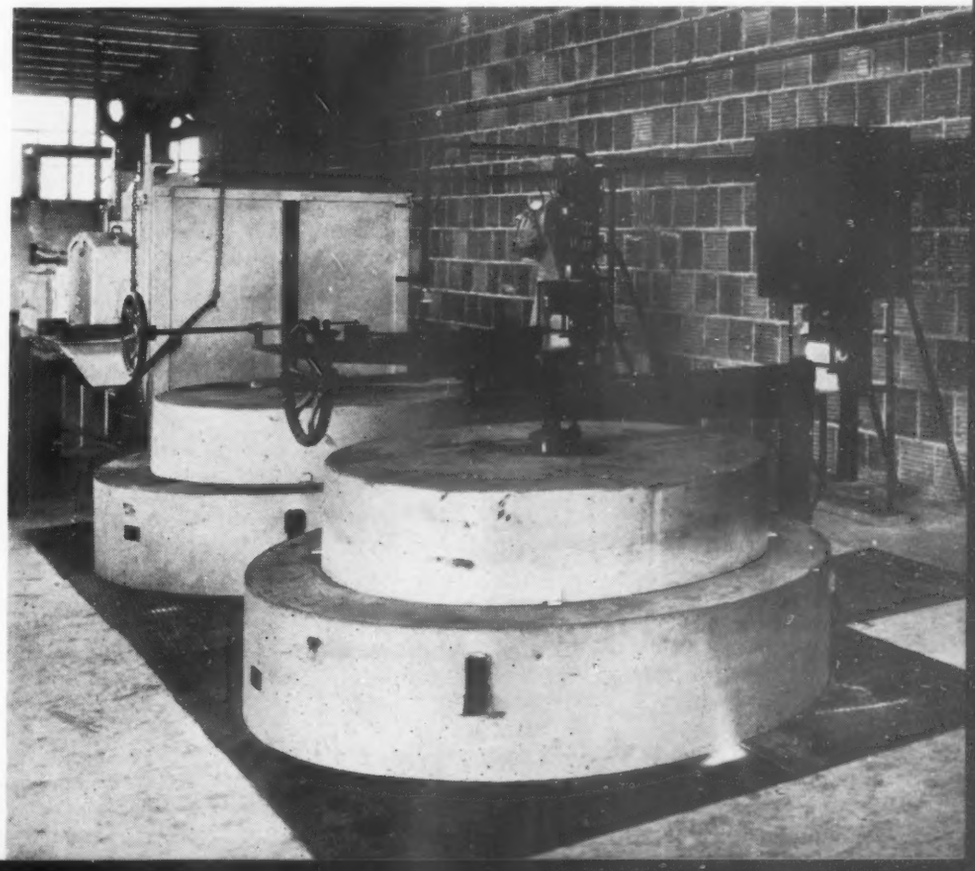


Fig. 6—Pit furnaces of this type are used by Bantam for heating and hardening

Western Metal Congress Papers Review Recent Progress in Many Industries

■ AN EXCEPTIONALLY wide range of subjects relating to the use of metals in industry were considered in technical sessions conducted by the American Society for Metals during the third Western Metal congress and exposition in Los Angeles, March 21-25. Some of the papers at early sessions were reviewed in STEEL for March 28. Herewith are resumes of papers of other sessions, these dealing with general industry; melting, smelting and refining; machinability; aeronautics; and foundry practice.

A session devoted to problems of mining, smelting and refining was attended by over 100 metallurgists and mining engineers. Introducing the discussion with a paper on metals used in production mining work, Dr. George B. Waterhouse, professor of metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., stated that mining depends largely on steels carefully selected for the work they must perform. Metals considered were principally steels or cast irons or metal in which iron predominates; tools included drill rod, drill bits, rock drill parts and grinding balls.

The author referred to the wide development in the last few years of so-called low alloy structural steels, which possess better elastic limit and ultimate stress than ordinary steel and have good ductility. These are used as-rolled, are fabricated with ordinary shop tools and are readily welded.

Metals Subjected to Heat

Factors involved in successful use of metal in pyrometallurgy were considered by R. S. Dean, chief engineer, and M. W. von Bernewitz, assistant mining and metallurgical engineer, metallurgical division, bureau of mines, Washington. Dr. Dean described early metallurgical apparatus, then pointed out that the successful use of metals depends upon effect of temperature on properties of the metals when they are subjected to heat as from gases.

Metals in actual contact with metallurgical reactions, particularly in roasting sulphides, were dealt with, then metals used in direct contact with molten metals, and metals more or less protected from molten metals and hot materials by refractories. It was stated by Dr. Dean that future tendency will be to take into account a possible simplification of apparatus.

Metals used in the dredge mining industry were discussed in a paper by C. M. Romanowitz, sales manager, and H. A. Sawin, assistant sales manager, Yuba Mfg. Co., San Francisco. Mr. Sawin asserted that many dredges are now used in mining gold, platinum and tin, there being in existence today more than 300 of the bucket line type. Steel is the chief material of construction. Strong metals, he said, play an important part in the precious metal mining industry.

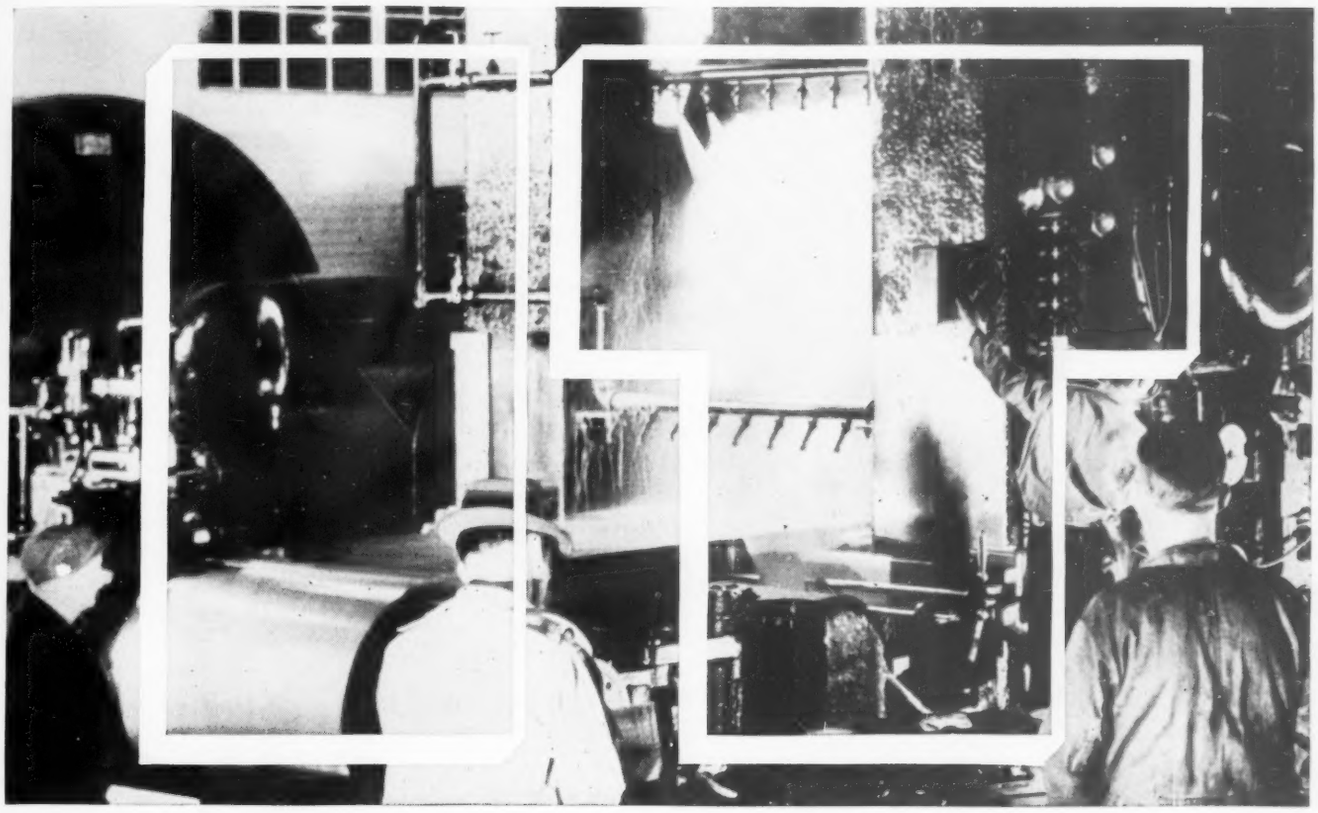
"Electrolytic Manganese, the First Step in a Program for Establishment of an Electrometallurgical Industry at Federal Power Projects in the West," was the title of a second paper by R. S. Dean. The speaker described a new development of materials for whose production the west has natural advantages. Successful completion of the first step of the program was production of electrolytic manganese. Possible production of so-called deficiency metals also has been given attention. The new material is ideally suited to western federal power projects, particularly at Boulder dam.

Introducing a session on aeronautics, Dr. Clark Millikan, California Institute of Technology, Pasadena, Calif., offered encouragement to those working in this field. Weight of steel used in airplanes is in excess of 1 ton and at least 24 different types of steel are utilized, declared J. R. Goldstein, research en-

West Coast Finds Lure in Metals and Machines

■ Shown here are some of the 37,000 who attended the Western Metal exposition in Los Angeles, March 21-25. This group is intently watching the operation of a multiple-torch oxyacetylene cutting machine

HOW TO HANDLE



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gineer, Douglass Aircraft Co. Inc., Santa Monica, Calif.

Most important steels from tonnage standpoint are chrome-molybdenum and stainless steels; the former are used for highly stressed structural parts, the latter for corrosion resistance and high temperature stability. The largest proportion of stainless is the 18-8 chromium-nickel type. Considerable nickel steel is used in the form of bolts, nuts and other threaded parts. Aluminum alloys are used because of high-strength, low-weight, ease of forming and inherent corrosion resistance. Magnesium alloys are in the form of castings. Concluding, the speaker said widespread use of metal in aircraft construction has had much to do with progress of aviation.

Safety, comfort and performance of modern airplanes are made possible through availability of lightweight, high strength materials, among which magnesium alloys are occupying an increasingly prominent part, declared A. W. Winston, metallurgist, Dow Chemical Co., Midland, Mich. Principal alloying elements are aluminum, zinc and manganese in varying amounts never exceeding a total of 12 per cent. Magnesium alloy sand castings are used, extensively; development of wrought alloys has been slow. Magnesium alloy sheet is used abroad for fuel and oil tanks, furniture, cowling and fairings but this application has not yet found widespread commercial production in this country. The author emphasized that the use of magnesium alloys in aircraft construction will result in increased payloads and improved performance.

Deals With Aluminum Alloys

Design, production and use of aluminum alloy forgings in the aircraft field was covered in a paper prepared by A. A. Handler, manager, and L. W. Davis, technical department, forgings division, Aluminum Co. of America, Cleveland, and presented by Mr. Handler.

Analyzing the use of metals utilized in automobiles, Prof. Bradley Stoughton, dean of engineering, Lehigh university, Bethlehem, Pa., stated that the metallic components of a car are made up chiefly of cast iron, plain carbon steel, low alloy steel, high alloy or special steel, aluminum and its alloys, and zinc alloy die castings. In considering each of these metals in relation to its use, the speaker gave specifications. It was pointed out that fusion and resistance welding have assumed enormous importance in the fabrication of automobile elements.

Special quality forgings for aircraft service was the subject of a paper prepared by Waldemar Naujoks, chief engineer, Steel Improvement & Forge Co., Cleveland, and presented by H. W. McQuaid, assistant chief metallurgist, Republic Steel Corp., Cleveland. Weight and perfect dependability are important considerations in these forgings, and the steel must be free from all minute cracks and broken fibers.

Forging practice at present is a radical departure from previously accepted forging methods, asserted the author. Inspection during every step of the procedure is imperative because progress of man's mastery over the air depends entirely upon his ability to produce aircraft without one weak link in the chain of parts.

A paper on stainless steel for aircraft, contributed by Carl de Ganahl, president, and W. L. Sutton, chief engineer, Fleetwings Inc., Bristol, Pa., and presented by the former, enumerated the many favorable properties of stainless for aircraft construction. The high toughness, difficult machining qualities and great hardness of stainless steel even though its ductility is good make it a difficult material to fabricate, however. Mr. de Ganahl said that only a general aircraft design will put stainless steel definitely in competition with light alloy structures.

X-Ray Inspection Imperative

X-ray inspection of aeronautical material was described by T. A. Triplett, Triplett & Barton Laboratories, Burbank, Calif., who declared that this examination must be employed to insure a higher standard of material than has been obtainable previously. This paper was not a treatise on radiography, but dealt chiefly with factors which affect quality of the finished x-ograph.

Discussing the limitations of interpreting x-ray photographs, Dr. V. N. Krivobok, associate director of research, Allegheny Steel Co., Brackenridge, Pa., emphasized that it is impossible to detect minute inclusions, etc., by this method.

A thorough study of the production of tin plate for use in containers for the food industry was incorporated in a paper prepared by B. W. Gonser, research engineer, Battelle Memorial institute, Columbus, O., and presented by L. G. Petree, research department, Continental Can Co., Oakland, Calif. This paper discussed modern methods for making the ferrous base, methods of coating with tin and conversion of the tin plate into containers. Ensuing discussion centered around porosity in tin plate.

Metals used in the chemical industry were considered in a paper contributed by F. L. LaQue, development and research engineer, International Nickel Co. Inc., New York, and presented by G. L. Cox, development engineer of the same company. Metals discussed were aluminum and high aluminum alloys, copper and high copper alloys, iron and steel, nickel and high nickel alloys, lead and high lead alloys, precious and semiprecious metals and stainless steels.

Principal factors that influence choice of a metal or alloy for any given use in the chemical industry include the following: 1. Availability in required forms; 2. amenability to fabrication; 3. ability to withstand stresses of service; 4. resistance to corrosion; 5. freedom from harmful effects on product processes or possession of some beneficial effect; 6. cost, including scrap value in case of obsolescence. Corrosion resisting characteristics of several major classes of metals and alloys were dealt with at length.

Fabrication and uses of stainless steels containing up to 18 per cent chromium were discussed in papers by Prof. Bradley Stoughton, dean of engineering, Lehigh university, Bethlehem, Pa., and Dr. V. N. Krivobok, associate director of research, Allegheny Steel Co., Brackenridge, Pa.

Metallurgical microscopes were made the subject of a paper by H. W. Zieler, president, E. Leitz Inc., New York. Discussion centered about the requirements of a good microscope. The author enumerated limitations of some instruments and pointed out recent new developments. Dr. S. L. Hoyt, director of metallurgical research, A. O. Smith Corp., Milwaukee, contributed comments on the polarizing microscope in its relation to the study of rolled materials.

Traces Tool Steel Progress

Two papers on tool steels, one dealing with carbon and low alloy types and the other with high speed and highly alloyed types, were contributed by J. P. Gill, chief metallurgist, Vanadium-Alloys Steel Co., Latrobe, Pa. In the first paper, he considered seven types of tool steels in detail and touched upon major characteristics of 13 others.

In connection with the second paper, Mr. Gill stated that in our modern production methods, high speed steel has an economic importance entirely out of proportion to the tonnage produced or its economic value. It is today's representative of oldest known steels, namely, tool steels. Carbon and manganese content of all high speed steels is of great importance. Cobalt is the only element other than vanadium that has been added to composition of high speed steels since the inception of this type of steel. Distribution of segregates has considerable effect upon the characteristics of the steel. Factors which determine cutting ability are: 1. Ability to resist soft-

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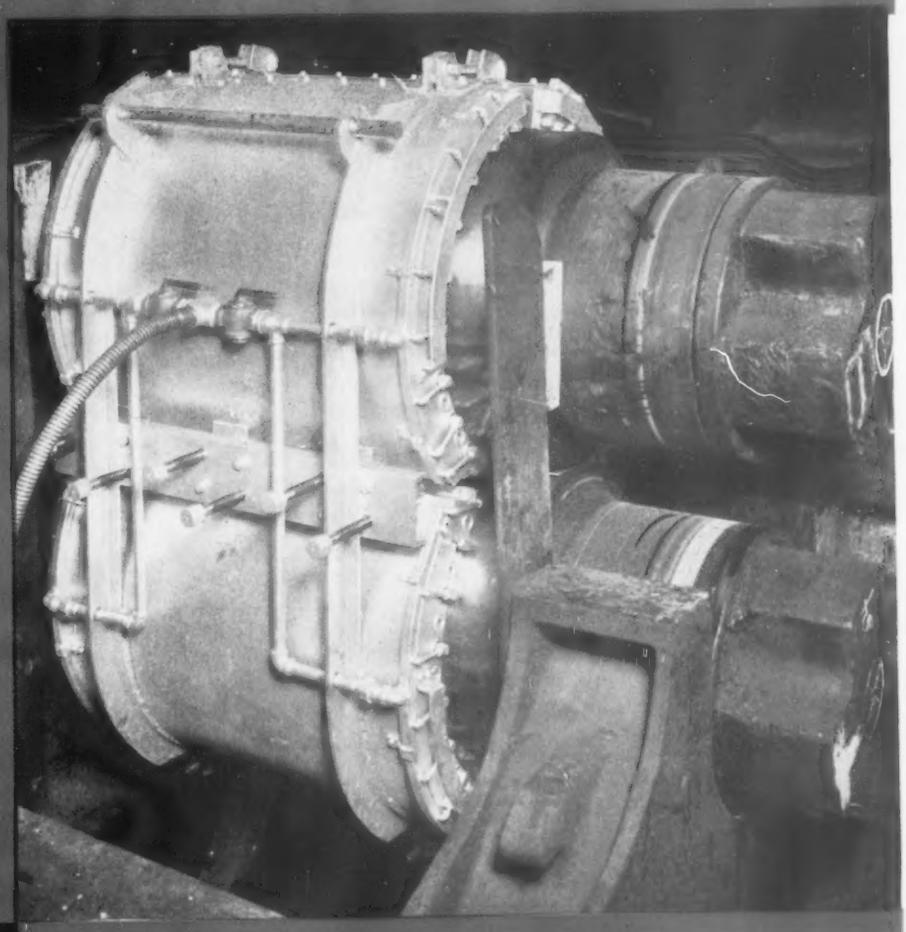

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ening at elevated temperature; 2. strength and toughness; 3. resistance to wear hardness.

Controlled furnace atmospheres and heat treatment of materials in these atmospheres was made the subject of a paper by E. E. Thum, editor of *Metal Progress*, Cleveland. The author stated that this controlled atmosphere has a far wider application than merely bright annealing. His paper considered the nature of the furnace gases required for scale-free heat treatment of steels within the ordinary limits set by softening anneals and hardening quenches, and described typical installations for the accomplishment of heat treatment wherein decarburization, scaling and the like, are within control of operators.

In discussion, John Disario, metallurgist, Columbia Steel Co., Torrance, Calif., said many steel casting plants on the West Coast are making full use of proper control methods in their heat treating and annealing processes.

Hardenability Is Important

Hardenability as it affects heat treated parts was discussed in a paper by Dr. M. A. Grossmann, director of research, Carnegie-Illinois Steel Corp., Chicago, who defined the meaning of hardenability and pointed out how this characteristic is important in commercial products. The speaker commented that future work will determine the precise quantitative effects of various factors.

J. D. Armour, metallurgist, Union Drawn Steel division, Republic Steel Corp., Massillon, O., discussing "Making Steel Free Machining," called attention to the many variables encountered when investigating machinability of steels in regular production. He described a "laboratory production test" used by his company that eliminates some of the variables. A working theory of machinability in steel is favored by low strength, low ductility, and the presence of some constituent to break up the continuity of the ferrite. The paper showed how chemistry, hot and cold working, and thermal treatment may be used to produce the best combination of these characteristics in various types of steel.

Machinability of alloy steels was considered by H. W. McQuaid, assistant chief metallurgist, Republic Steel Corp., Cleveland, who reviewed the manner and extent that various alloying elements affect machinability. He pointed out that in most cases machinability is of secondary importance in the processing and use of alloy steels because it is generally more important to make use of the favorable properties of alloys, rather than to consider only speed and ease of machining.

Mr. McQuaid discussed two main types of materials, namely, those that are heat treated after machining and those that are heat treated before machining. He said that by the control of rolling or forging, normalizing, annealing or spheroidizing, it was possible to aid machinability in the cases of those steels heat treated after machining. In those materials machined after heat treatment, attention must be given especially to tool design, tool composition and lubricants.

The degree of machinability of a material bears a direct and important relation to the cost of the finished product, whether it be a gas stove, dredge or automobile, declared E. K. Smith, metallurgist, Electro-Metallurgical Co., Detroit, in a paper he prepared on machinability of ferrous castings. This paper, presented by J. H. Spillane, metallurgist for the company in San Francisco, dealt with some of the practical phases involved in production of machinable castings, and specifically with types of metal produced. The paper laid stress on uniformity of both gray iron and steel and important factors in measuring machinability.

Fabricating Aluminum Alloys

A paper prepared by W. A. Dean, research metallurgist, Aluminum Co. of America, Cleveland, and presented by William Holzhauer, the company's representative in Los Angeles, dealt with machining of cast and wrought aluminum alloys. The author enumerated the various alloys in common use and reviewed the manner in which they are processed in fabrication. He listed the considerations to be taken into account in machining, type of tools employed, tool design and lubrication.

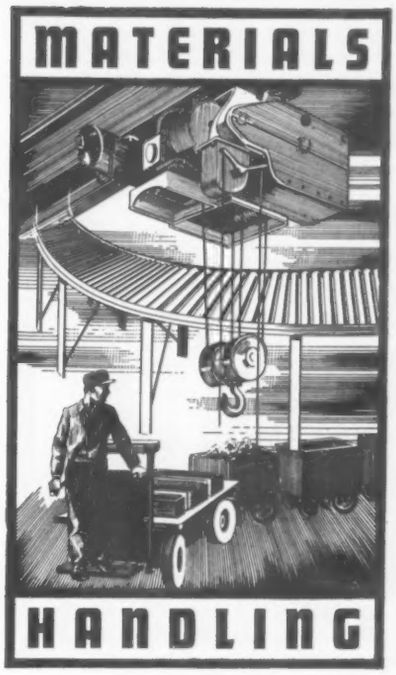
Two sessions were devoted to foundry problems and properties of cast alloys. Improvements in steel castings by moderate alloying and heat treatment were considered in a paper contributed by F. A. Melmoth, vice president, Detroit Steel Casting Co., Detroit, and presented by A. L. Herzig, chief metallurgist, Climax Molybdenum Co., Detroit. The author asserted that by using proper steel analysis and correct final heat treatment it is possible to produce castings giving physical properties well up to those of many worked steels. He showed that a large proportion of small castings can be given severest of quenching treatments and evaluated the response to these treatments as it affects performance of the material.

Nickel steels and irons were dealt with in a paper prepared by F. J. Walls, development engineer, International Nickel Co. Inc., Detroit, and T. N. Armstrong, development and research division, same company, New York. The authors stated that uncertainties which crept into production of nickel irons have been brought under control by better operation of the cupola and a better understanding of external and internal factors that influence the physical properties of cast iron. The diversi-

(*Please turn to Page* 58)

Modernistic Motifs Feature Show Displays

■ **In its attractiveness and scope, the third Western Metal show in Pan-Pacific auditorium, Los Angeles, a week ago, compared most favorably with the larger shows held annually in eastern cities of the United States**



J. A. CRONIN, Materials Handling Editor

Floor-Space Economy

Production facilities of a machining department were expanded by use of trolley conveyor with unusual attachment links. Instrument enclosure is made dustproof

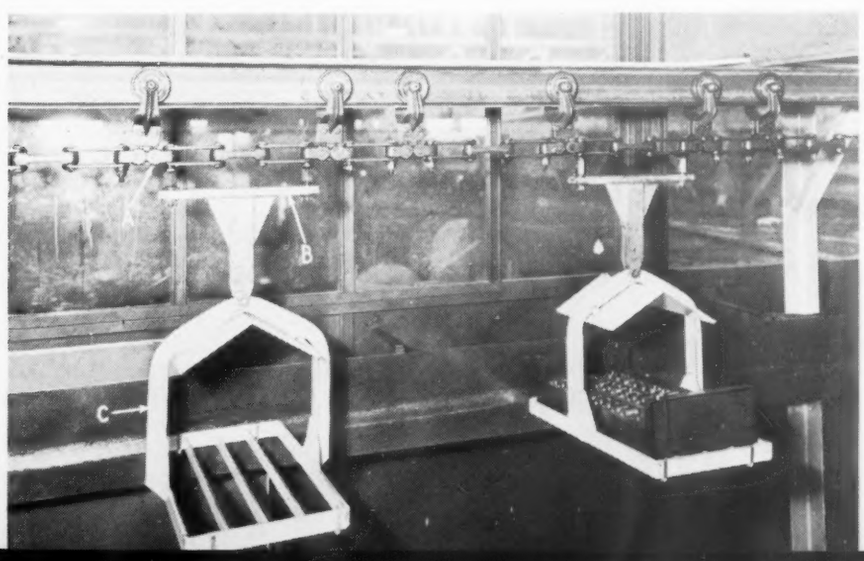
By M. C. DANNECKER
General Planning Department
General Electric Co.
Schenectady, N. Y.

■ AN OVERHEAD trolley conveyor, featuring vertical dips and unusually short vertical and horizontal radii curves, recently has been installed in the refrigerator department machining section at the Schenectady plant of General Electric Co.

When it became necessary to expand production facilities, the problem arose of increasing the capacity of the machining section without great increase in floor space. Part of the program involved constructing a mezzanine floor at one end of the center bay of the building to accommodate inspection and temporary storage of finished parts. These processes formerly occupied an appreciable area of manufacturing floor space.

Several parts used in the refrigerator compressor are held within limits of 0.0003-inch. These narrow limits require the use of a number of electric gages, in addition to the usual assortment of gages. To properly house an inspection department which uses precision gages on parts on which dust and dirt are not tolerable, entire mezzanine floor is enclosed with steel and glass partition and ceiling. Exterior windows are sealed. Filtered air is supplied to the room at a constant temperature of 70 degrees Fahrenheit, and inspection tables are lighted with mercury-vapor lights to reduce eye strain. To accurately gage parts with such close tolerances, it is essential that they cool to room temperature after the final cleaning operations of the machining section. One part of mezzanine floor is enclosed separately to keep storage of material clean while it is cooling.

This trolley conveyor was designed to transport approximately 120 boxes of material per hour from the cleaning operations of machining section to enclosed mezzanine floor and, from there, to assembly department on the main floor. Among factors necessitating use of a conveyor with vertical dips and unusually short vertical and horizontal radii of track were locations of various points to be served, wood-



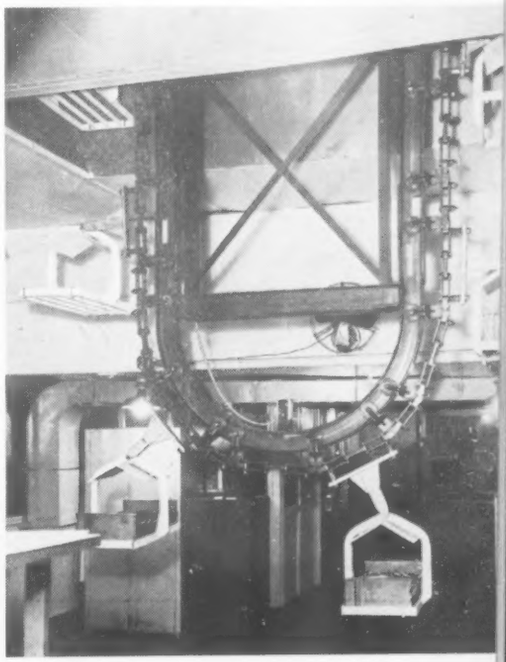
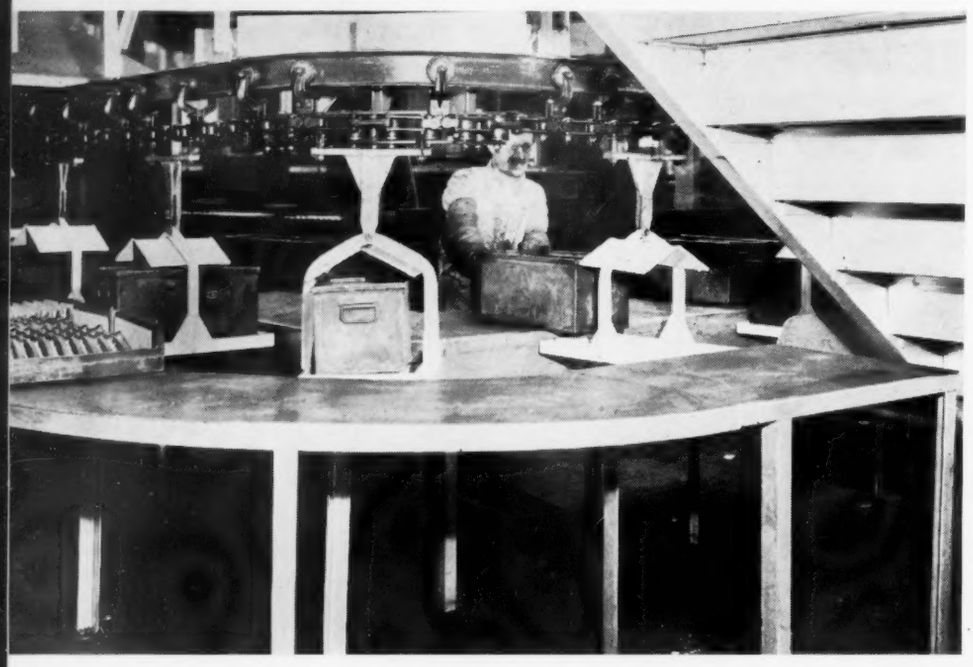
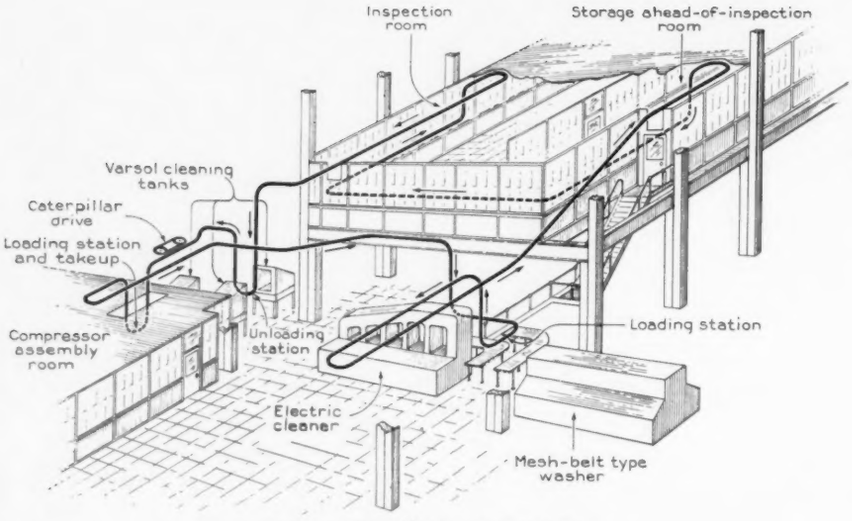


Fig. 1—Special attachment link (A), load bar (B) and tray and box carrier (C) on conveyor in refrigerator department. Fig. 2 (above)—An automatic takeup is provided at the vertical dip immediately following the drive. Photos courtesy General Electric Co., Schenectady, N. Y.





Conveyor for Delivering Material From Machine Dept Through Inspection To Assembly Dept

en roof-truss construction of an older type plant building and the need of conserving as much floor space as possible. It was considered advisable to use same type of 4-inch I-beam track and rivetless chain that has been standardized on other trolley conveyors throughout the department. These conveyors all consist of a light section, 4-inch I-beam track, 4-inch pitch rivetless chain, ball-bearing trolley wheels, brackets, "H" or "I" attachments for supporting the load on the trolleys and a standard design of roller turns with either 2 or 4-foot radius.

This particular installation, which is 500 feet long, utilizes all the foregoing standard items with the exception of attachments. An attachment link with a double swivel-chain connection was designed in co-operation with one of the leading conveyor companies. The adjacent chain link on each side of the attachment link is connected to it with a pin, thereby avoiding strains on the link. (See "A," Fig. 1). The sides are flush in order to pass through a caterpillar drive and around the roller turns.

Use Special Bolts

Load is distributed over a considerable portion of chain by means of a T-shaped load bar between trolley attachment links 12 inches apart. (See "B," Fig. 1). This bar is attached to chain with special bolts in place of the usual rivet.

Carriers are fabricated from bar stock and T-shaped sections to accommodate trays and boxes of sizes up to 12 x 20 x 10 inches. (See "C," Fig. 1). These carriers are bolted to the load bar so they are free to pivot to any position to provide sufficient clearance for the carriers on the 2-foot radius horizontal and the 2-foot, 6-inch radius vertical curves, it is necessary to space them at 40-inch intervals. Maximum permissible trolley spacing is only 16 inches, so it is necessary to insert an idler trolley and swivel attachment in the 24-inch space between load bars. The chain pull and wear have been kept as low as possible by using the sharpest vertical curves only at points near the floor.

Drive for this conveyor is obtained by a variable-speed, floating type,

(*Please turn to Page* 77)

Fig. 3 (top)—Containers for cleaned material are on steel table alongside conveyor and approximately one-inch higher than carrier level. Fig. 4 (center)—Path of the conveyor is clearly seen in this diagrammatic sketch. Fig. 5 (bottom)—Material too warm for inspection is stored in enclosed section of mezzanine floor adjacent to inspection room

Truck illustrated made by Automatic Transportation Co., Inc.

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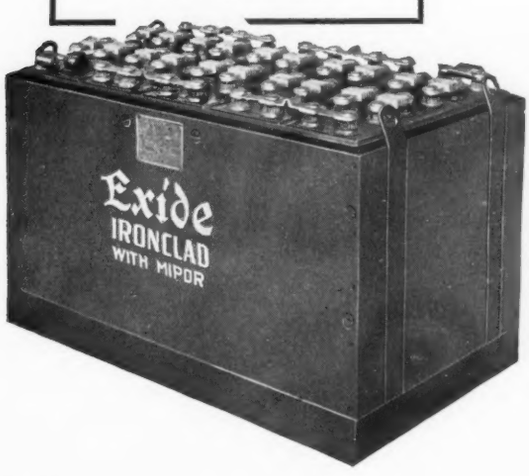

ELECTRIC industrial trucks of the right type can end "bottle necks" in a plant. They smooth out the flow of materials, simplify storage, and make tough handling jobs easy. There are giant trucks built today, with capacities hardly dreamed of a few years ago . . . trucks that answer the demand for greater power.

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Exide-Ironclads bring out the best in any electric industrial truck. They have the four essentials for this service —high power ability, high electrical efficiency, extreme ruggedness, and long life. Write today for free booklet, "In Selecting Any Motive Power Battery BE SURE."

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
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Western Congress Papers Review Recent Progress

(*Concluded from Page* 52)

fied application of low alloyed nickel irons with respect to more common static physical properties such as transverse tensile and brinell hardness are well known and established in industry. Heat treated irons continue to find new uses such as dies, gears and machine parts, Mr. Walls pointed out.

Attention was focused on chrome steel and irons in a paper prepared by E. K. Smith, metallurgist, Electro Metallurgical Co., Detroit, and presented by R. E. Brown, the company's representative in San Francisco. The author pointed out that a large number of compositions of chromium iron alloys with and without other alloying elements are in common use today. This paper was concerned particularly with some of the newer combinations and new developments in older compositions.

W. P. Woodside, vice president, Climax Molybdenum Co., Detroit, recounted the many vicissitudes encountered in the automobile industry in developing and establishing molybdenum steels in this field. The author's paper summarized extensive research of the past 30 years in development of molybdenum-bearing irons and steels. One of the limiting factors to use of these materials in the early days was lack of suitable heat treating equipment, Mr. Woodside said.

Hardening by Gas Flame

Flame hardening is particularly suited to hardening small contact areas in large sections which because of size and attendant distortion can not be handled economically in furnaces, said Dr. G. V. Slottman, research engineer, Air Reduction Sales Co., New York. Flame hardening results in a less complicated hardening technique, he explained, and offers the possibility of using less expensive plain carbon steels for many applications. Included in the paper was information on various types of steel which have been flame hardened and the metallographic and physical properties derived.

The ultimate answer to alloys research is to find better alloys, that is, alloys which will fill some specific need or have some specific property, declared William Romanoff, technical superintendent, H. Kramer & Co., Chicago, in presenting a paper on copper alloys prepared by himself of C. O. Thieme, chief metallurgist of the same company. Much of the paper was devoted to foundry practice in connection with production of brass and bronze alloys.

Sand cast and die cast aluminum alloys, their methods of production and subsequent heat treatment and machining, were dealt with in a paper contributed by H. J. Rowe, technical department, castings division, Aluminum Co. of America, Cleveland, and read by William Holzhauer, manager of the company's foundry in Los Angeles. The author covered the various compositions which are receiving widest commercial use.

Zinc alloy die castings were treated in a paper by W. W. Broughton, engineer, New Jersey Zinc Co., New York. Purpose of this paper was to present information on the numerous compositions available and the methods by which the castings are made to fill the needs of increasing applications.

Welded Oil Well Casing Is Safe and Economical

■ WELDING of oil well casing strings and welding of light-gage metals were among the important subjects given consideration at technical sessions of the American Welding society's western regional conference in Los Angeles, March 21-25, in connection with the third Western Metal congress. A report of these sessions appears herewith. A resume of the opening session of the conference was presented in the March 28 issue of STEEL; other sessions will be reviewed shortly.

A symposium on welded oil well casing strings occupied one session. In the opening paper, K. N. Saatjian, Texas Co., and Walter Main, Youngstown Sheet & Tube Co., presented pros and cons of conventional threaded and coupled joints and welded joints. Advantages rest with welded joints as regards tensile strength, tightness, cost and speed (in 10¾ inch size and larger) and ease of repair if the pipe end is slightly damaged. Threaded and coupled connections, on the other hand, are adaptable to heat treated and high-strength pipe, present no fire hazard, have less chance for defective joints to get by the inspector, cost less in small diameters, may be more easily removed and reassembled, and need less accurate tolerances as to out-of-round, etc.

On balance, therefore, it would seem that "surface casings" (large pipe with setting depths ranging up to 1100 feet) may be welded, economically, and this is now usual practice in California fields, although even this is rarely done in the Mid-continent field. Deeper strings for water and oil flow, requiring high strength and thick wall pipe, usually are coupled. At present, the welder is faced with the primary problem of speeding up his operations and reducing setting time to at least a comparable basis with threaded and coupled casings. A means of welding higher strength casing materials would also help.

The latter problem was discussed by J. C. Hodge, chief metallurgist, Babcock & Wilcox Co., Barberton, O., and C. R. Sadler, vice president, Babcock & Wilcox Tube Co., Beaver Falls, Pa., in a comprehensive paper on weldability and properties of materials for casing strings. Practically all casing conforms to one of four grades specified in American Petroleum institute standard No. 5-A (Seamless or Electrically Welded):

Grade	Minimum yield, pounds per square inch	Minimum tensile, pounds per square inch
A	30,000	48,000
B	40,000	70,000
C	45,000	75,000
D	55,000	95,000

These properties generally are obtained by increasing carbon and manganese simultaneously, typical analyses being:

Grade	Carbon, per cent	Manganese, per cent
A	0.08-0.18	0.30-0.60
B	0.20-0.30	0.30-0.80
C	0.30-0.42	0.60-0.90
D	0.35-0.48	1.10-1.70

Grades A and B are easily weldable. Grade C, having considerable air hardening properties, is somewhat beyond the range of steels ordinarily classed as "easily weldable." This is the one investigated by Messrs. Hodge and Sadler, it also comprising the bulk of steel pipe used for casing.

Grade D so far has been restricted to bottom lengths of the deepest wells; required physical properties are given by a heat treatment such as quenching and drawing, or normalizing. Since at these great depths casing must resist collapse from external hydrostatic pressure, and yieldpoint rather than ultimate strength is the criterion of excellence, high yield point casing also has been fabricated of low alloy steels similar to those used for light-weight structures. Two such already have been manufactured in limited quantities: (1) An intermediate manganese, medium carbon

steel of Grade D, but heat treated; and (2) a manganese-copper steel (0.30 maximum carbon, 1-1.25 manganese, 1.0-1.1 per cent copper) normalized and reheated to 925 degrees Fahr. for precipitation hardening.

One manufacturer produces high-yield casing by taking pipe of Grade B or C, perhaps 10 per cent larger than required size, and reducing it cold to correct dimension by external pressure, thus increasing yield point in compression by the well-known effect of plastic overstrain (cold work).

The problem of welding is to produce a tight joint of good strength rapidly while the pipe is in an upright position. No time is available for preheating and stress relieving cannot be permitted. In fact, the metal should not be hardenable steel, in the usual sense of the word, for the casing is lowered into the well immediately the joint is completed, and it is therefore in effect quenched.

Experience with heavy plate welding indicates that carbon content of 0.35 to 0.40 per cent, with usual amounts of manganese and silicon, is about the top limit; beyond that hardening upon welding is liable to produce cracks in weld hardened areas. This carbon limit would be decreased by the slightly extra manganese in Class C pipe, but decreased by the rather thin walls, so it might be predicted that Class C casing would be readily weldable.

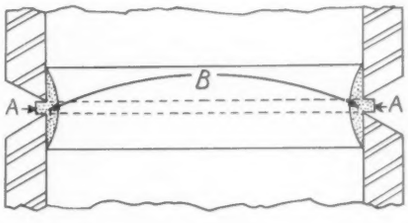
Backing-Up Ring Is Used

This proved true. To insure rapid welding to the bottom of the vee, without danger of interior protrusions, the authors use a light backing-up ring whose cross section looks like that of a short stove bolt. When this ring is placed between abutting pipe ends, as shown in the accompanying illustration, the sharp vees are separated 1/16-inch and only a 1/16-inch rounded ridge projects inside the pipe. The dimensions are the smallest at which penetration through the spacer projection *A* to the main body of the ring *B* can be secured without danger of burning through.

Welds of this kind were made on Grade C pipe with electrodes chosen to give tensile strengths equal to the base metal. Samples cut from the joints withstood all quality tests imposed — tension, bending, impact. Complete welded pipes were tested in tension; yield point stress varied from 57,400 to 63,000 pounds per square inch and ultimate strength from 84,000 to 89,000 pounds per square inch (unwelded pipe being 59,300 and 89,000 pounds, respectively). Internal hydraulic bursting tests caused failure at circumferential or hoop stresses of 90,500 to 104,300 pounds per square inch. External pressure tests showed that collapse occurred half way from joint to end bulkhead, the reinforcement at the weld due to extra metal deposited at this point being considerable.

It would appear from Messrs. Hodge and Sadler's experiments, therefore, that 5-inch pipe with ¼-inch wall thickness, containing 0.40 per cent carbon and 0.80 per cent manganese, can be arc welded without preheating or stress relieving into a tough (nonbrittle) joint whose strength properties are better than 90 per cent of the metal in the pipe wall.

Papers presented at one session were concerned with problems in welding light-gage materials. As a general introduction to the subject, Stanley Levyn, sales manager, Acme Electric Welder Co., Huntington Park, Calif., described some of the modern equipment now available and its underlying principles in a paper on resistance welding. In general, heat and pressure are still required for welding operations — as much so in present-day automatic equipment as in the blacksmith's prehistoric forge. The advantage we possess is in precise control of the essentials. Five varieties of resistance welding are common: 1. Butt-welding, 2. flash welding, 3. spot welding, 4. seam welding, and 5. projection welding.



Cross section of backing-up ring used in welding together two lengths of steel pipe in an oil well casing string

Butt welding, introduced by Elihu Thomson in 1885, has largely been superseded by flash welding. In the old process, abutting ends were firmly pressed together before the current was turned on; in the new, the potential is impressed before the parts come in contact so that an arc is struck as they move together. Disadvantages of the butt process are: (1) It requires close fitting, (2) the upset is considerable, (3) the joint is decarburized, (4) it is comparatively slow and (5) it can join only the readily weldable metals.

Spot welding also has some of these disadvantages, but they have largely been mitigated by marvellously accurate timing of current dwell, either continuously or a series of impulses, and close voltage regulation. The former is done by electron tube controls, the latter by as many as 75 taps on transformer windings. Pressure is accurately adjustable by air cylinders. Electrodes or contact points, hard metals of high conductivity, have also been greatly improved.

Projection welding has certain elements of flash welding, in that current is localized at places where the articles touch on prepared embossings or projections. As many as 20 welds can be made simultaneously; the welder is built like a press for heavy pressure and large transformer capacities. Properly set-up, and working on properly prepared parts, projection welding, in Mr. Levyn's opinion, is "One of the most practical, fool-proof, and productive methods known."

Resistance welding, as just described, has some limitations, which were inferred rather than specified in a discussion of "Problems in Welding Light-Gage Materials" by J. J. Bruton, the Linde Air Products Co., Los Angeles. A principal limitation is in the production of smooth, water-tight seams in thin metal.

Smooth joints are made in such things as automobile bodies by flash welding methods, but this requires exceedingly large and expensive machinery, and a high degree of precision in the previous work of forming and pressing the abutting parts to be joined. It is therefore confined to mass production in the truest sense of the word. Tight joints can be made in lapped seams by "seam welding," which is merely a series of spot welds so close together that they overlap. Such joints, said Mr. Bruton, are sometimes unsuitable on two counts: (1) the extra bulk of the lap and (2) the fact that the faying surfaces — that part of the overlap which is unwelded — attract moisture by capillary action and are the locus of accelerated corrosion.

Discusses Oxyacetylene Process

A butt seam, welded by the oxyacetylene process, and surplus metal ground off, is free from these objections. It is therefore the preferred process for such sheet metal objects as those which are later to be enameled or have smooth, sanitary joints, and those which must be liquid tight. Aside from these fields of mass production, the oxyacetylene equipment, in Mr. Bruton's opinion, is one of the most adaptable tools for the sheetmetal worker, being able to make joints on all types of commercial alloys and by brazing, soldering and low-temperature methods as well as by fusion welding. A considerable portion of his paper was given over to highly practical hints on shop practices, jigs and fixtures, and economical co-ordination of welding with such other equipment as shears and bending brakes so as to reduce scrap and

increase over-all economy of the shop.

Dealing with spot welding of aircraft materials, Charles L. Hibert, Consolidated Aircraft Corp., San Diego, Calif., paid most attention to procedure in handling Alclad, 52 S and 53 ST—the only aluminum alloys which the army and navy approve for spot welding, and then only for such nonstructural parts as junction boxes, food lockers, cowl flaps, floors, inspection doors, tables and other furnishings. Equipment at the San Diego plant comprises one 125 kilovolt-ampere machine installed late in 1935, and modified in many regards for the work in hand. Working on flying boats, some 65 minor parts are made for each ship, with a total of 13,720 welds per ship. A crew of two men make 2000 to 10,000 welds per shift, averaging 4000.

Work is delivered disassembled. First it must be cleaned of surface oxide, top and bottom of all welded points. This is done by immersing the edges 30 seconds in a weak mixture of hydrofluoric acid with alcoholic solution of gum-tragacanth. If heat oxide is present, it must first be scratched with emery paper to permit the acid to work underneath. The acid-gum is washed off in running water after which the loose oxide can be swabbed off with a wet rag.

Work is then assembled, piece by piece, and each joint spot welded on ½ to 1-inch centers as specified before adding another unit. Often the connections are so close that it is impossible to reach a missed spot after the next part has been added.

Electrodes Must Be Clean

Several variables must be controlled. First the electrodes. Mr. Hibert has fixed upon an electrode tip ⅝-inch diameter, 1½ inches long, with a 7-degree machined end. Copper is the best material known, although it alloys readily with the aluminum and "splashing" occurs. Hence it is necessary to clean tips with No. 7/0 sandpaper after 6 to 10 welds, and redress them after 200 to 400 welds.

Pressure applied to the electrodes should be constant, once fixed for the job. Increase in pressure requires higher current, for it lowers contact resistance. Time of current dwell can be raised to 10 cycles with general improvement in uniformity. What happens is that a small slug melts and then solidifies, the spot weld therefore being a small casting inside a wrought article, and worth only the shear strength of the alloy in its cast condition. The spot weld fails in tension along the boundary of the "cast" slug and the parent metal as would be expected.

In practice, it is necessary to set pressure and time and then adjust the current to obtain the best weld as shown by a tearing test. A weld that will pull a slug with a diameter four times the sheet thickness when rolled apart with pliers, is considered satisfactory. As a precaution, all long seams are finished with rivets, to prevent tension failures from starting. Mr. Hibert was not hopeful of a wide extension of the method to structural parts because of the inherent metallurgical limitations of the melted spot, and complete lack of a suitable inspection method.

In discussion, Capt. W. A. F. Millinger, air corps reserve, said that the great difficulty in adopting a mass production tool like a spot welder to aircraft fabrication is the fact that aircraft are still tailor-made. Fifty ships of a given design would be a large order. A second handicap is conservatism, or rather caution; everyone must be so imbred with the idea of safety that no one likes to take chances with a new process.

Stainless Is Ideal Metal

Although few minor parts of stainless steel sheet are spot welded at Consolidated Aircraft Corp., Mr. Hibert has had enough experience with it to characterize stainless as "the ideal resistance welding material because of its low carbon content, high electrical resistance, and oxide-free surface. If stainless becomes widely used, it is safe to predict entire airplanes of spot welded stainless construction." The speaker pointed out that steel has a wide plastic range, consequently the weld is equivalent to an annealed, fine-grained wrought structure, and hence has good physical properties whether stressed in tension, tortion or shear.

A somewhat fuller exposition of spot welding methods on stainless steel sheet was given before one of the American Society for Metals' sessions by Carl de Ganahl, president, Fleetwings Inc., of Bristol, Pa. Mr. de Ganahl is the leading exponent of the use of stainless in aviation, having gone so far as to construct an amphibian of stainless steel—complete as to structure and skin.

Mr. de Ganahl issued a warning against any supposition that stainless can be welded without experienced labor. Watchful intelligence is necessary to recognize variations that influence quality of welds, even when automatic devices on the welding machine indicate pressure and current conditions to be normal. A great deal of welded stainless has been giving excellent service in high-speed railroad cars and in deck structures on ocean steamships, so that ample experience and evidence of quality is now available for the aircraft industry.

Automotive Engineers Talk Passenger Cars

(*Concluded from Page* 28)

probably as a result of the severe character of tests.

Babbitted connecting rod bearings proved satisfactory for supercharged engine operation.

Talking on transmission developments, S. O. White, Warner Gear division, Borg-Warner Corp., Muncie, Ind., asserted revival of planetary gearing in transmissions is the most important development in this field. He also said that while gear-shift levers probably are doomed, transmissions cannot be fully automatic because drivers want controls which by-pass the automatic feature when necessary.

New shapes in leaf springs; a new grooved type of leaf; inserts of fiber, rubber, bronze and lead-antimony, are recent developments in automobile springs which have aided uniformity and prevented squeaking, according to Tore Franzen, experimental engineer, Chrysler Corp., Detroit. He reported increasing interest among engineers in air springs for automotive work, these being devices of rubber, fabric or metal using air in compression for springing. A new plant is about ready to go in operation in Detroit for production of air springs.

What the public wants in riding comfort was reviewed by Roy W. Brown, engineer in charge, air spring division, Firestone Tire & Rubber Co., Akron, O. How to soften spring suspension without sacrificing stability of the car is one of the chief problems faced by designing engineers. Surveys show that springs determine 33 per cent of the smoothness of a ride.

More Cars Without Chassis

Greater popularity of unit-type or chassisless frame construction was forecast by Joseph Ledwinka, chief engineer, Edward G. Budd Mfg. Co., Philadelphia. He reviewed progress in present frame designs and noted how introduction of steel bodies and all-steel tops strengthened bodies and led to realization that a further reduction in weight can be made by decreasing weight of the frame and strengthening the lower section of the body.

The unit-type frame already has been used in Chrysler Airflow models, and is currently used in the Lincoln Zephyr. It is used widely in Europe, and at least one of the manufacturers in the low-price field in this country is proposing to adopt this system on volume-production models next year.

Mr. Ledwinka said improved welding techniques have done much to make automobiles less expensive, more attractive and stronger.

MORE TROUBLE "THREADING" THAN A *Cross-eyed Seamstress!*

Shell not only solved the problem, but increased output from 12 to 30 units per hour!

THE O. M. EDWARDS COMPANY of Syracuse, N. Y., manufactures steel sash and office equipment. Trouble was being encountered on the lathes threading ¾" stainless-steel rods. Shell was called in to help solve the problem.

The Shell engineer found that the improper cutting oils used in this operation were resulting in ragged threads, clogged dies, and frequent stoppages for cleaning and adjusting.

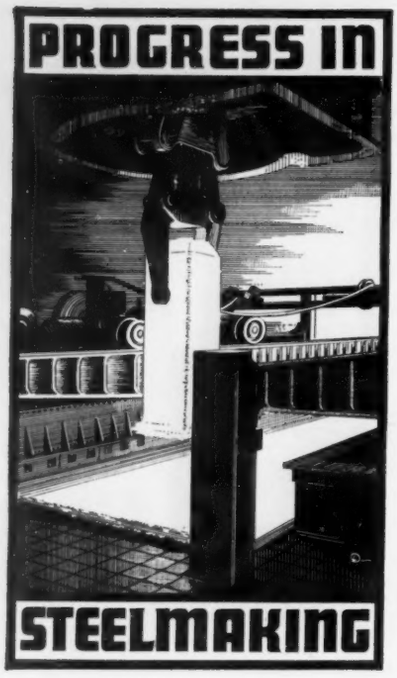
After making a careful survey of all operating conditions, the Shell representative recommended the specific Shell Cutting Oil for this type of job. This superior product was ordered and put in use the next morning.

Results were immediate with this Shell Cutting Oil: Clogged dies and ragged threads were eliminated, and production of the ¾" rods *was increased from 12 per hour to more than 30 per hour!*

. . .

This fine performance by a Shell Cutting Oil at the O. M. Edwards plant is being repeated in machine shops all over the country. Leaders in developing better cutting oils, Shell leads in getting *results*. No matter what your problem, call on Shell to find the *right* answer with the *right* lubricant. For immediate service simply call or write your nearest Shell office.

SHELL CUTTING OILS



Roll Heating

New method indicates significant fuel economy over conventional methods can be obtained, helping to lower cost of short runs on special sheet products

By T. R. MATTHEWS
Plant Manager
Eastern Rolling Mill Co.
Baltimore, Md.

■ MORE AND MORE, the steel industry finds it necessary to produce steel to exacting and varying "prescriptions" of its customers. Consumers today must have material which will meet specific requirements, such as corrosion and abrasion resistance or provision of added strength with accompanying weight reduction.

This divergence in specifications is particularly true of steel sheets which run the entire gamut of steelmaking experience. Whenever the steel industry enters a hand-to-mouth buying period, small spot shipment orders predominate and the hand sheet mill assumes even greater importance in the steel picture.

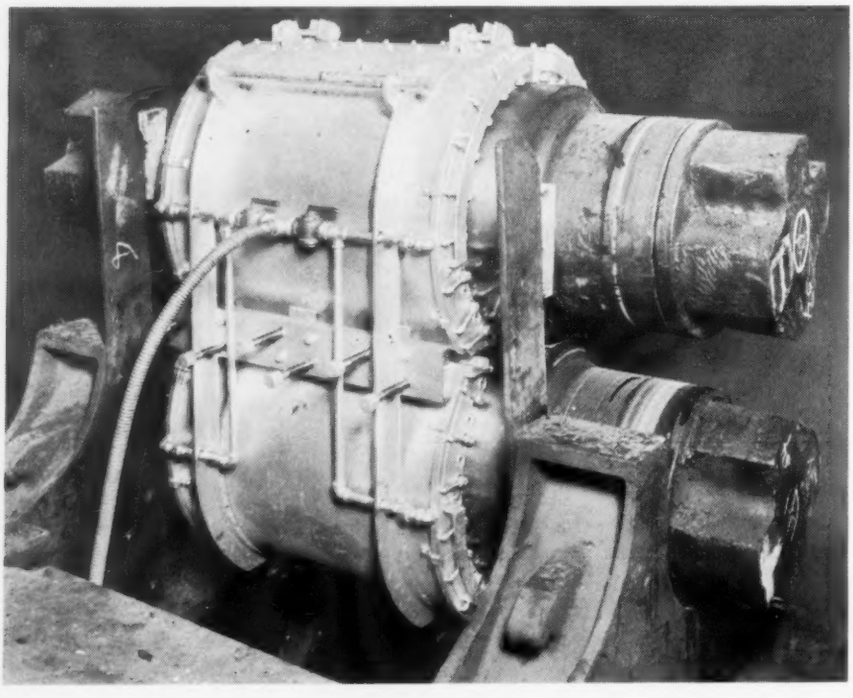
Sheet manufacturers who have made determined efforts to develop manufacturing flexibility to fill small orders quickly and economically enjoy an immense advantage. Obviously, production of an individual job lot order at the right price is a difficult assignment for large continuous or merchant mills. This is where the hand mill finds its place in the economic structure of the steel industry. It seems destined to maintain that place in the future. However, even the hand mill must keep up to date. It must lower its costs further, if possible, and attain even greater flexibility.

In the experience of Eastern Rolling Mill Co., a problem arising in conjunction with hand-mill practice is that of proper rolls for production of each individual order received. Rolls must be of correct diameter and length and have the proper contour. Likewise, they must be ground frequently to maintain the desired surface. Of course, rolls must be changed often to meet the specifications of individual orders.

Heating Problem Involved

Necessity of frequent roll changes involves the problem of heating. When the mill is started up on Monday morning, or when rolls are changed because of change in size or type of sheet being produced, the rolls first must have been brought up to a surface temperature of about 450 degrees Fahr. before being placed in mill housings. For years this operation has been done with electrical roll heaters, made up of a series of resistance-type strip heaters attached to a frame to fit snugly around the rolls.

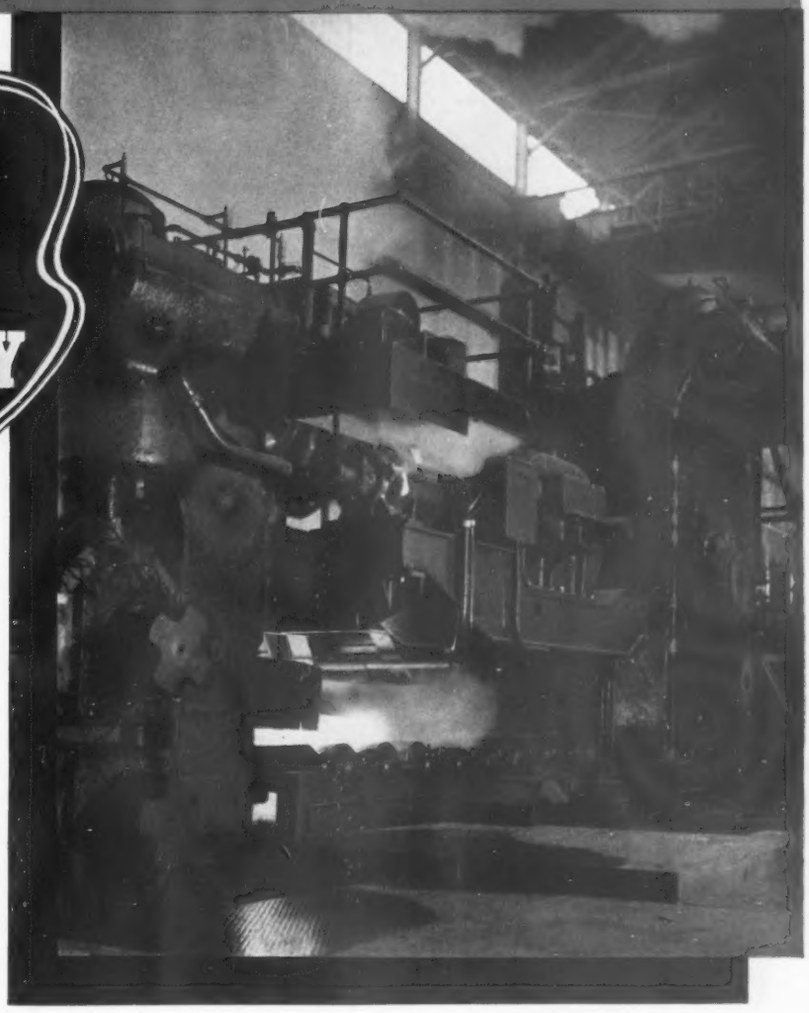
These heating elements must be in actual contact with the rolls. If not, insufficient heat is transferred and life of the element is shortened due to excessive temperature. Transfer of heat by contact of the individ-



Radiant-tube roll heater warming up pair of rolls. Premixed air and gas is fed into unit and burns in alternate tubes from both ends of heater

MEEHANITE

IN THE *Steel* INDUSTRY



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Warren Foundry & Pipe Corp. ..... Phillipsburg, N. J.
Washington Iron Works ..... Seattle, Washington

TABLE I

Gas Usage in Cubic Feet and Average B. t. u.'s per Hour

Period	B. t. u. contents of gas 500	1,000	Average B. t. u.'s per hour
7 a. m. (burners lit) to 9 a. m.	800	400	200,000
9 a. m. to 7 p. m.	4,150	2,075	208,000
Total gas consumed to bring roll surface up to working temperature of 440 degrees Fahr.	4,950	2,475	207,000
7 p. m. of first day to 7 a. m. of third day, holding at 440 degrees Fahr.	8,600	4,300	120,000
Total gas	13,550	6,775	140,000

ual elements results in more spotty heating than would result if the heat were applied uniformly over the entire surface.

Recently, a gas-fired roll heater has been developed in the Eastern Rolling Mill Co. plant by C. M. Kemp Mfg. Co., Baltimore, whereby this heating operation can be performed more economically with gas fuel. This roll heater, now marketed under the name Radiatube, consists of a series of high-chromium alloy tubes in a supporting frame which is clamped around a pair of rolls. The tubes, 1½-inches in diameter, are fired from alternate ends with a complete air-gas mixture under positive pressure, the gas flame being ½-inch in diameter.

Ratio Maintained Automatically

Fuel mixture is supplied by an industrial carburetor, which automatically maintains correct ratio of air and gas regardless of variation in load. Tubes vary in length for different roll lengths. A heater with tubes 42½ inches in length will heat rolls from 44 to 54 inches long. Tubes are backed by a reflecting sheet which in turn is covered with 2 inches of insulation held in place by heavy steel supporting shell and frame.

The unit is clamped tightly to pair of rolls being heated. Tubes do not actually touch roll surfaces. Heat is transferred by radiation, eliminating hot spots. Firing from alternate ends of adjacent tubes maintains an even distribution of heat. Quantity of heat is controlled either manually or automatically by a graduated index cock. The air gas mixture is carried to heater proper through a flexible metal hose which connects to a pipe manifold from the industrial carburetor.

Typical figures on gas heater usage in the Eastern Rolling Mill Co. plant for heating and holding a 30-inch diameter, 48-inch long roll in a 46-inch heater, having tubes 42½ inches in length are shown in Table I.

This 46-inch heater can be used to heat rolls from 44 to 54 inches in length, but somewhat more heat is required with the longer rolls. The most efficient use is when roll face is not more than 2 or 4 inches longer than the heater.

As a basis of comparison, Table II shows the figures when the same 30 x 48-inch roll was heated by an electric roll heater 44 inches long.

For heating this roll, both heating up and holding for 36 hours, 6.77 million B.t.u.'s as gas replaced 1742 kilowatts of electricity. Since 3412 B.t.u.'s are equivalent to 1 kilowatt hour, we find 6.77 million B.t.u.'s as gas replacing 5.94 million B.t.u.'s as electricity. Thus 1.14 B.t.u's gas equals 1 B.t.u. of electric heat. Table III gives the relative costs at which gas and electricity must be supplied if above heating operations are to be performed at *the same costs* with gas on the 46-inch gas roll heater, and electricity on a typical 44-inch electrical roll heater.

We find that the several gas-fired units in operation in the Eastern Rolling Mill Co. plant are particularly economical from the standpoint of first cost, operation and maintenance costs. Automatic temperature control may be readily applied and it also is a simple matter to set the gas control valve for manual operation. Comparisons in costs between gas and electric power, of course, will vary considerably due to lack of uniformity in rates in the different steelmaking centers as, for instance, between natural and artificial gas. Viewed from all angles, our operating experience has indicated that gas fuel has a definite place in the steel mill provided it is utilized with the proper type of equipment.

TABLE II

Electric Usage in Kilowatt Hours and Average per Hour

Period	Kilowatt hours	Average kilowatts per hour
7 a. m. (start) to 5 p. m.	768	76.8
5 p. m. to 7 p. m.	38	19.0
Total electricity consumed to bring roll surface up to working temperature of 440 degrees Fahr.	806	67.2
7 p. m. of first day to 7 a. m. of third day, holding at 440 degrees Fahr.	936	26.0
Total electricity	1742	36.3

TABLE III

Electric Cost Equivalents

Gas cost per 1000 cubic ft., of B.t.u.'s, indicated 500	1000	Electric cost per kilowatt hour
$0.50	$1.00	$0.0039
0.40	0.80	0.0031
0.30	0.60	0.0023
0.20	0.40	0.0016
0.10	0.20	0.0008

♦

Clinics To Demonstrate Welding of Nonferrous

■ Latest developments in welding practice for nonferrous alloys will be demonstrated at two clinics to be held in Atlanta, Ga., April 15-16, and in New York, May 6-7, under sponsorship of the International Nickel Co., New York; Aluminum Co. of America, Pittsburgh; American Brass Co., Waterbury, Conn.; and Handy & Harman, New York.

These clinics will deal with practical problems involving the latest methods of electric and oxyacetylene welding and brazing of monel metal, aluminum, nickel, copper, brass, bronze, inconel and nickel-clad steel.

The Atlanta clinic will be held in the warehouse of the J. M. Tull Metal & Supply Co., 285 Marietta street; the one in New York at Whitehead Metal Products Co. Inc., 303 West Tenth street.

Publishes Book On Locomotives

■ A book embodying reference work of practical information concerning the manufacture, test and performance of mining and industrial locomotives has been recently published by National Electrical Mfg. Assoc., New York. Single copies of the publication may be obtained for 60 cents by addressing the association.

☆

How to take the "Beard" off a bowling ball

☆

Problem: Every time a composition bowling ball comes out of the mold, there's a jagged fin, or "beard", around it that must be removed. Right there you run into one of the many finishing problems of the plastics industry.

A steel ball would present much less of a problem. But when the manufacturer used ordinary grinding wheels the plastic material of which bowling balls are made quickly became "tacky". Finishing took too long, cost too much.

Answer: Carborundum engineers spent weeks at the factory studying the problem. Back at the laboratory they experimented with new grits, new bonding materials, and new methods of cooling. The answer was a specially bonded wheel designed for wet operation. The problem was solved, and the manufacturer's production quickly jumped as a result.

AN INVITATION TO EXECUTIVES CONCERNED WITH MANUFACTURING

Whatever you make, there are two ways in which The Carborundum Company's Abrasive Service can help your company. Highly trained abrasive engineers are ready to help solve any special grinding or finishing problem that may confront you. Also, without obligation, they will study your present abrasive set-up, report on its efficiency, and wherever possible, indicate how production can be improved or savings effected. Write to The Carborundum Company, Niagara Falls, N.Y. and a representative will call.

CARBORUNDUM

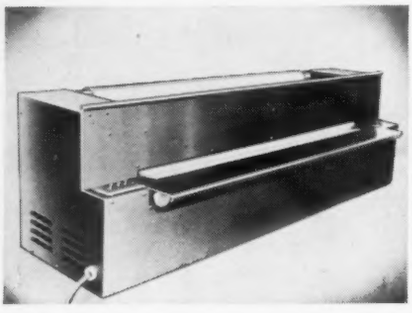
REG. U.S. PAT. OFF. BRAND

ABRASIVE PRODUCTS

FOR ACCURACY AND ECONOMY IN MANUFACTURE

NEW METAL PRODUCTS

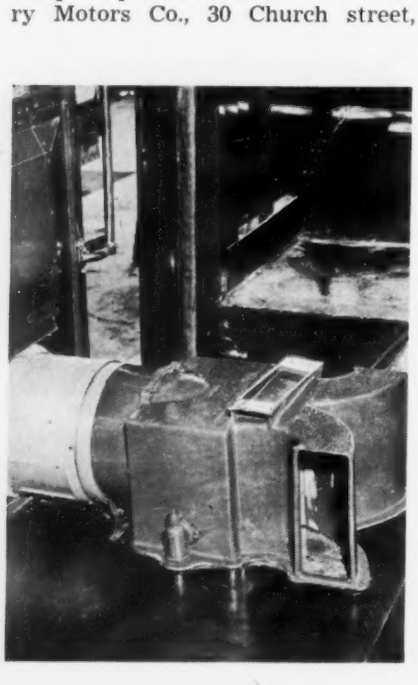
■ A new printer with advanced features has been announced by Charles Bruning Co., Chicago. The unit, known as the model 4 printer for blueprints or black and white



prints, is of the continuous type. Tracings and paper are carried on a heavy, endless canvas band past a curved contact glass, inside of which are mounted two new style, long-life mercury tubes, providing the illumination for exposing the print.

■ Something new in the field of mechanical wire bindings is the new two-color Spiral binding developed by Spiral Binding Co., 148 Lafayette street, New York. By means of a new process and equipment, one continuous piece of steel Spiral binding wire is now produced in all binding lengths and in any two colors over an almost unlimited range.

■ A new heating and ventilating unit for motor coaches has been developed by American Car & Foundry Motors Co., 30 Church street, New York. The heater core provides 1200 B.t.u.'s per minute, air being drawn in from the side of the coach. In the summer the heat can be cut off and the fan forces 420 cubic feet of fresh air per minute into the coach.

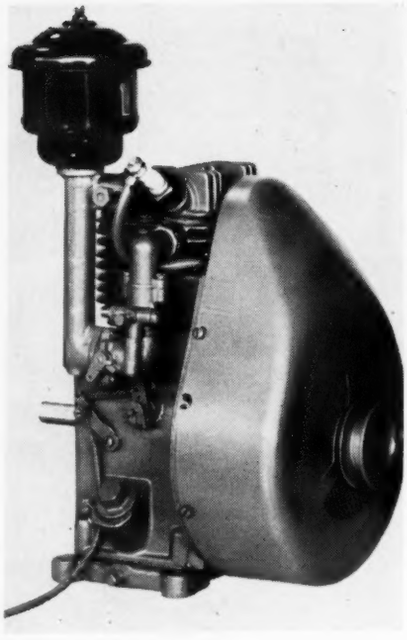


■ A new method of taking finger prints is by the Diamond finger print machine, a development of Misener-Diamond Finger Print Machine Co., 326 East Washington street, Syracuse, N. Y. The lid of this unit is the ink table and the card passes directly through the machine without smudge or blur, claimed to be a decided improvement over present methods of finger print registration. The small, nickel-plated unit is compact and easy to carry.

■ Styled by Clement Thelander, Chicago, for Premier Stove Co., Belleville, Ill., is a compact version

of a gas range, illustrated here. It is designed to save floor space, yet has a standard-size oven, separate broiler compartment, full-size 4-burner cooking top and an utensil cabinet. It has all steel body construction, rock wool insulation, bakelite hardware, and porcelain enamel finish. Optional standard colors and trim are furnished.

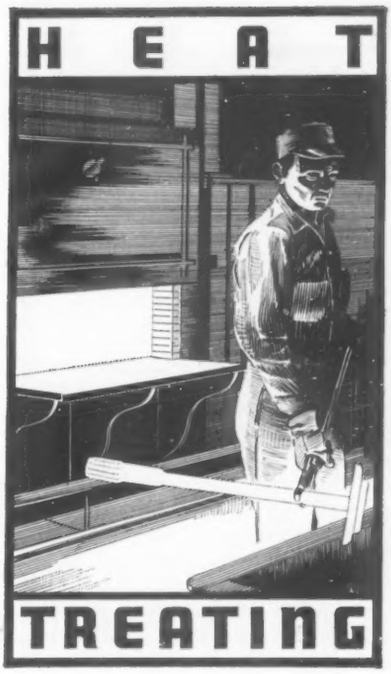
■ Three new air-cooled engines are a product of Lauson Co., New Holstein, Wis. These include ½, ¾ and 1-horsepower units. The 1-horsepower unit has outstanding characteristic of light weight, advanced cooling and ball bearings. A compact 4-cycle gasoline engine, it is claimed to develop over 1.4 horsepower. The ½ and ¾-horsepower units are especially adapted for power lawn mowers, sprayers, dusters and garden tractor applications. These models have completely dust sealed magnetos, screen in flywheel housing and oil bath air cleaners. Illustrated is one of the fractional-horsepower units.



■ Harrisburg Steel Corp., Harrisburg, Pa., has announced the Harrisburg seamless steel liquefiers, used to convert dry ice to gaseous or liquid carbon dioxide. They are formed from the company's own special analysis steel and processed by specially designed machinery. The closure is guaranteed not to leak. All parts are accurately machined to insure immediate tight seal at either low or high pressure.

■ Malleable iron guard rail posts for highways are a new product of Dayton Malleable Iron Co., Dayton. Two types of posts are used alternately, a tall one to support both plank and wire and a short one to furnish additional support for the plank. The malleable iron post itself is bolted to a pre-cast concrete foundation. Because of the high elastic limit and shock-resisting qualities of malleable iron, it is claimed the post is able to withstand sudden impact and deformation without breaking.

■ York Ice Machinery Co., York, Pa., has introduced a new portable air conditioner for the residential and office field. It incorporates a number of improvements over the previous model and is housed in an attractive sheet steel cabinet styled by Walter Dorwin Teague, industrial designer. It weighs approximately 550 pounds, representing a weight reduction of about 55 pounds compared with the previous model.



Novel Spring Heaters

In making automobile springs, controlled gas fuel heaters with conveyors raveling between the furnaces assure uniform heating, high production and high quality

By J. B. NEALEY

American Gas Association
New York

TRAVELING conveyors and controlled gas fuel have been combined to form efficient mechanical heaters in the production of coil springs at the Chevrolet Forge Spring & Bumper division, General Motors Corp., Detroit. Most Chevrolet coil springs are made from hot rolled, silicomanganese, SAE 9260 steel rounds. Spring dependability is assured through precise control over all operations. Every different size bar in each heat is given a hardenability test and an acid test for depth of decarburization.

Four heating operations are employed. First bar ends are heated for pointing; second, the stock is heated throughout its length for coiling; third, the coils are reheated for hardening, and again for tempering.

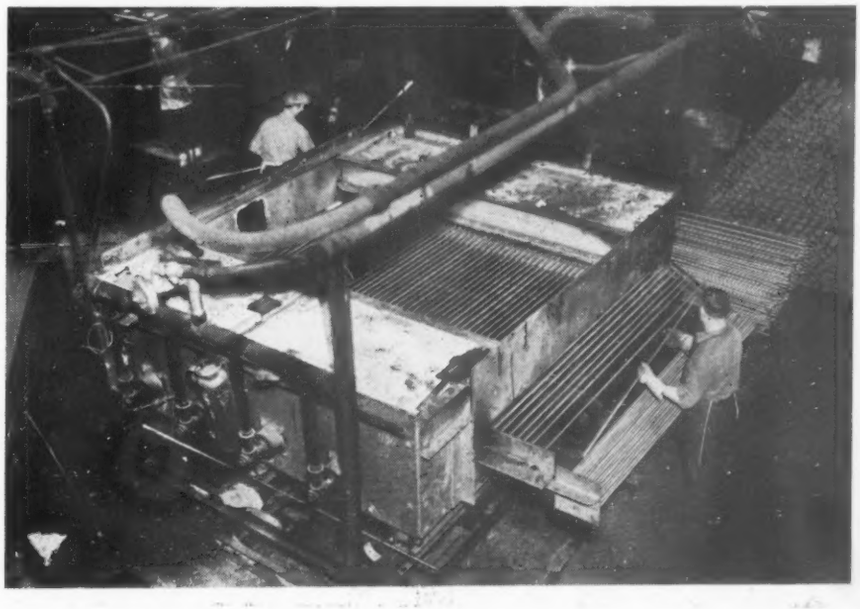
Bars Ground First

The bars, 96¾ inches in length first are ground to 0.072-inch diameter in centerless grinders. Depth of all decarburization is held to 0.008-inch in this operation. A slat-type conveyor between two rows of these grinders carries the stock to a gas-fired, double-end heating unit consisting of twin, slot-type furnaces located on a common base so as to face each other. A traveling conveyor between these furnaces carries the bars along with their ends protruding through the slots into the furnaces where they are heated. One furnace is on slides so that the distance between the two can be adjusted to accommodate various bar lengths. Each furnace is about 8 feet long and is heated with four gas burners on a single manifold. Both ends of the steel are pointed in one set of rolls.

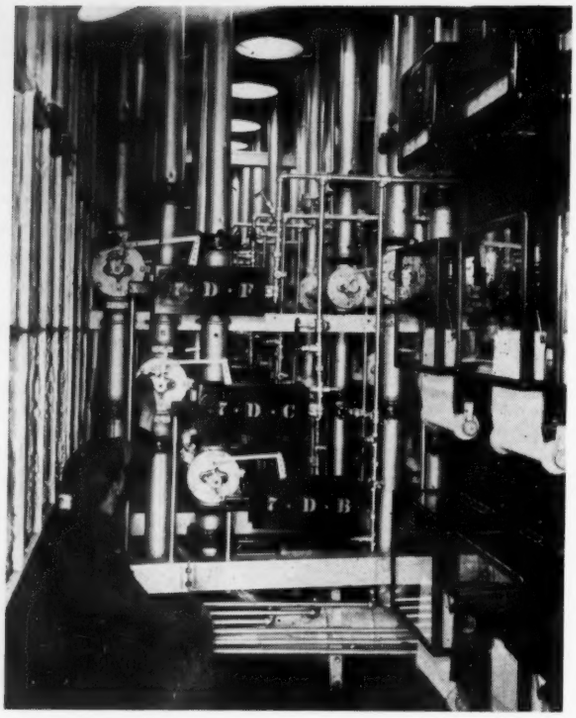
By locating the temperature controllers, recording pyrometers, control valves, etc., in one central room, these furnaces are always under the direct supervision of the chief metallurgist. This is accomplished by using a low-pressure, gas-air proportioning system in conjunction with a single blower for pressure air and single valve control. Air is supplied at 1½ pounds pressure to inspirate the gas which is dropped to atmospheric pressure in any desired ratio. All lines to furnaces run through the central control room where they are provided with valves actuated by temperature controllers directly connected to thermocouples in the furnaces.

Bars Are Heated

Three continuous gas furnaces heat the pointed bars throughout their length for coiling. Two of these are walking-beam type while the third is equipped with a mechanical pusher. Walking-beam furnaces are 6 x 8 x 12 feet inside with a capacity of 150 bars per hour. Heat is supplied by eight tunnel-type gas burners with one low-pressure, air-gas proportioning mixer per furnace. A single thermocouple located in the top arch near the center of the discharge end of the furnace actuates



Conveyor carries bars with ends in twin, slot-type, gas furnaces to heat them for pointing. Assembly is adjustable to accommodate bars of various lengths



Central control room showing automatic temperature control equipment with recording pyrometers. Motor driven valves are actuated by potentiometers

the automatic temperature control. A time cycle of 22 minutes is employed and the work is heated to 1700 degrees Fahr.

The third furnace, with a capacity for heating 300 bars per hour, is 16 feet long, 7 feet high and 18 feet wide inside. It is provided with 12 gas burners and four proportional mixers. The time cycle is the same as for the walking-beam furnaces. The gas burners are divided between two automatic temperature controls, thus dividing the heating chamber of the furnace into pre-heating and soaking zones. A line of alloy pins rides on alloy U-rails. Work is loaded onto these pins and pushed through by a mechanical pusher. As the hot work is discharged from the furnace the pins are pushed off the upper rails and drop into a lower set of U-rails and a small mechanical pusher forces them back to the loading end of the furnace. A small elevator then lifts them from the lower to the upper rails where they are reloaded. Main pusher then forces them with their loads onto the rails and through the furnace again.

Hot Metal Provided

These three gas furnaces provide hot metal for six mechanical coilers where the bars are coiled on a revolving mandrel, ends broached square and the coiled springs, weighing 10.6 pounds each, conveyed to the gas-fired, hardening furnace which has a capacity for 330 coil springs per hour and is 20 feet long, 7 feet 10 inches wide and 4 feet high inside. The work is taken through on an apron-type conveyor.

The combustion system includes 22 gas burners with adjustable secondary air shutters and six low pressure inspirators. Furnace is zoned by three automatic temperature controls which maintain temperatures of 1550, 1550 and 1600 degrees Fahr., respectively. Work is in the furnace 45 minutes. The quench machine for the hot coils has 12 heads, each containing a hydraulic press which closes the spring to the right length and plunges it into an oil bath.

Springs Are Drawn

The springs, now 10 inches long and 3½ inches in diameter, are drawn in a gas-fired furnace of the force-convection type which will treat 6000 pounds of springs per hour. Carried through on a slat-type conveyor, the springs are heated to 1000 degrees Fahr. during a time cycle of 52 minutes. This leaves them with a hardness of 364 to 444 brinell. Heated air is blown into this furnace from two separate, barrel-type, gas-fired heaters mounted on top and provided with automatic temperature controls, safety pilots, safety cutoffs, etc. Final operations include finish grinding both ends, sand blasting, bulldozing and scale testing. The finished outer coil spring weighs 9.7 pounds.

The inner coil spring is wound cold from 0.4375-inch round steel wire of SAE 9260. Wound to an outside diameter of 2 inches and in 10-foot lengths these are cut into shorter springs. Then they are heated for quenching in a continuous, gas-fired furnace equipped with a chain conveyor and special alloy carriers. This furnace is 7 x 8 x 19 feet overall and has six gas burners connected to two low-pressure, gas-air mixers and two automatic temperature controls. The work is in the furnace for 16½ minutes where it attains a temperature of 1600 degrees Fahr. after which it is quenched in oil.

The capacity of this furnace is 413 springs per hour. Ends of the springs are closed and broached. After drawing the springs in the same furnace as used on out coil springs they are checked for hardness, load tested, sand blasted and checked for scale.

This walking-beam furnace heats bars for winding into coil springs. It has eight gas burners fed from one inspirator

GENERAL ELECTRIC ANNOUNCES

Brighter MAZDA lamps

NEW LOW PRICES

SIGHT SAVING SIZES REDUCED AS MUCH AS 25%

The 19th Major Price Cut in 17 Years
Effective April 1st, 1938

SIZE	WAS	NOW
75 WATT	20¢	15¢
100 WATT	20¢	15¢
150 WATT	25¢	20¢
50-100-150 WATT	50¢	45¢
100-200-300 WATT	65¢	60¢
200 WATT	35¢	30¢
300 WATT*	60¢	50¢
500 WATT (Clear)	$1.40	$1.20
Clear, medium base.		
Silvered Bowl Lamps		
100 WATT	60¢	55¢
150 WATT	70¢	65¢
200 WATT	95¢	85¢
300 WATT	$1.45	$1.35
500 WATT	$2.25	$2.05
Daylight Lamps		
100 WATT*	35¢	30¢
150 WATT	50¢	45¢
200 WATT	80¢	75¢
300 WATT	$1.20	$1.15
500 WATT	$2.15	$1.95
Inside frosted.		

Space does not permit the listing of all the types and sizes of lamps made by G-E. Many other lamps are also affected by this latest price reduction, including lamps for streets, highways, trains, locomotives, and street cars.

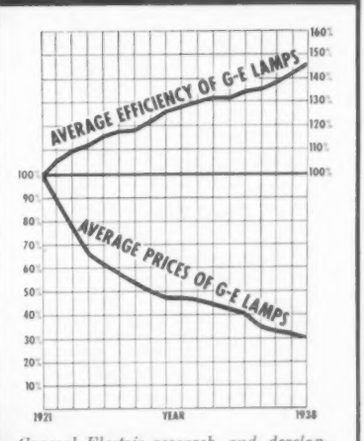
"They stay brighter longer!"

Better light for shops, offices, factories

On April 1st General Electric announces a double saving for every shop, office, or factory that wants better light for better sight: *First*, new brighter MAZDA lamps that *stay brighter longer* and give more light than ever before. *Second*, General Electric's 19th major price reduction in 17 years. New low prices on sight-saving sizes used in the home, stores, offices, factories, schools, and transportation.

These new, brighter MAZDA lamps and new low prices offer you great advantages toward bringing lighting standards up to the modern requirements for efficient, safe seeing. They make your lighting costs lower than ever.

Because of this continued policy of offering better and better MAZDA lamps at lower and lower prices, it pays to insist that the lamps you buy carry the famous G-E monogram on every bulb. General Electric Company, Nela Park, Cleveland, Ohio.



General Electric research and development are constantly at work to increase the light output of MAZDA *lamps and to reduce prices. The above chart shows graphically what has been accomplished since 1921. Average bulb prices are down 70% . . . while average efficiency has climbed 46% in the same short time.*

GENERAL ELECTRIC

Industrial Equipment

Positions Unaltered During Work Process

■ Wandsbeker Werkzeug Gesellschaft Beinhoff & Co., 40 Kurze Reihe, Hamburg-Wandsbek, Germany, has placed on the market Bocarno models swing arm drilling and grinding machines which drill and grind large size pieces at any spot within the capacity of the machine without altering the position of the piece during the process.

Machines are constructed either of cast iron or steel tubing. Units of the former construction have a drilling capacity of 1¼ inches for iron steel, copper and aluminum sheets. The capacity for solid materials is ¾ inches, and in wood and marble the capacity ranges up to 10 inches. The machines of steel tubing have a drilling capacity of 2 inches for the metal sheets, and ⅜ inches for the solid materials.

These machines have several driving possibilities. They may be driven from an overhead shaft through belting or from an electric motor fitted on the base-plate on the arm near the pillar and then through belting. If desired, a beltless drive may be provided, the machine being driven through a shaft and gearings coupled with an electric motor for single driving speeds. The two drives mentioned before have two, three or four, and one, two or three speed, respectively.

Distance between the center spindle and center pillar for the machines fabricated of steel tubing is normally about 1500 millimeters, and for the cast iron-constructed units 1500 millimeters.

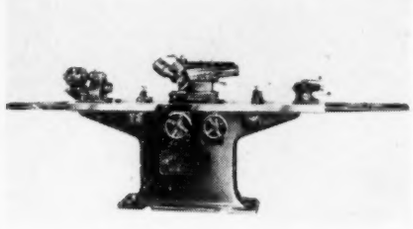
These units can also be utilized in conjunction with an elastic grinding head for surface grinding and grinding off burrs on castings and welds.

Machine Handles Both Flat and Round Broaches

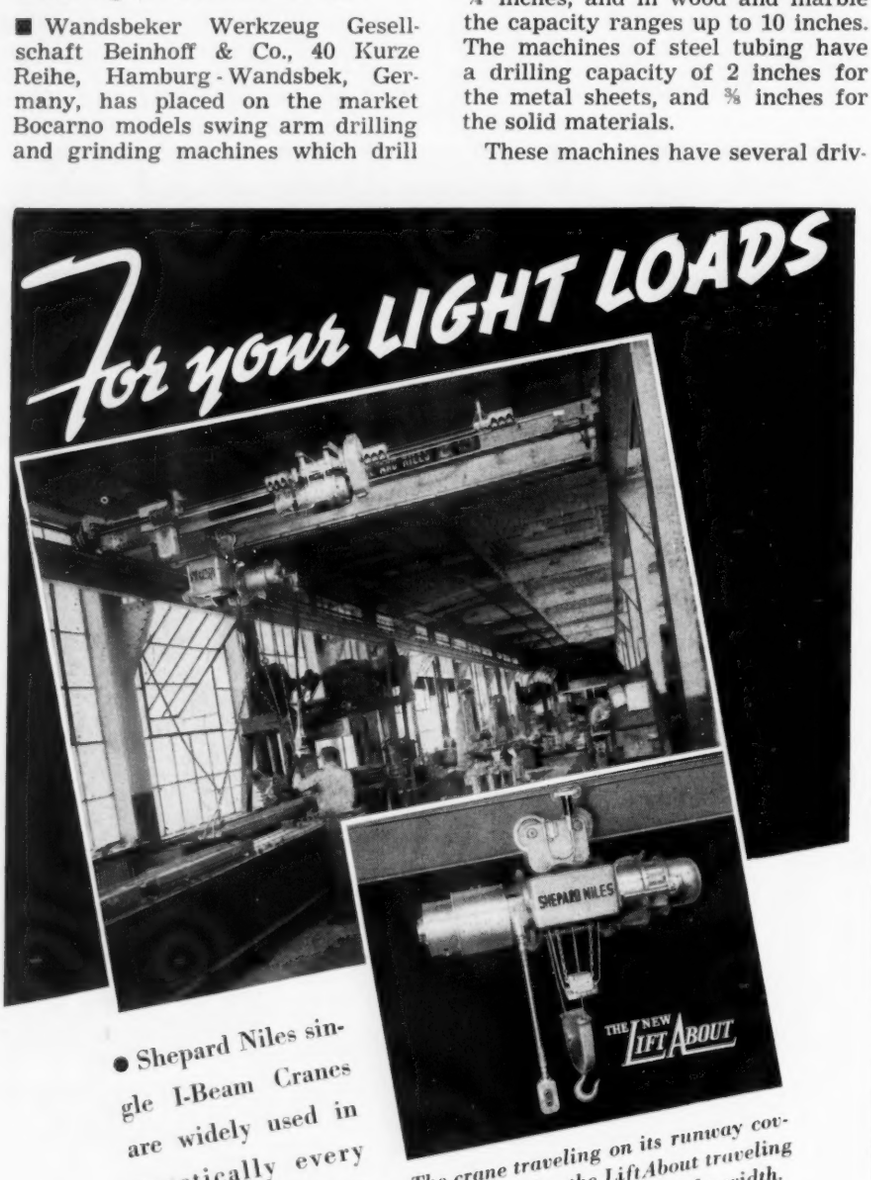
■ Colonial Broach Co., Detroit, has introduced a broach sharpening machine designed to handle both flat and round broaches.

Sharpener is provided with a grinding head adjustable through an arc of 180 degrees horizontally, permitting complete reversal of the head. Vertically the head is adjustable from a horizontal position to 90 degrees below horizontal. Head is fitted with a hardened and ground slide traveling on two hardened and ground roller chains riding on similarly treated ways in the head support. Rolls are held to 0.002 inches for diameter and entire slide system is sealed against grinding dust. Head is adjustable for side play and also designed so that hydraulic feed for automatic operation may be incorporated if desired.

Grinding wheels are 5 inches in diameter with a ½-inch face. For backing off a 3-inch diameter wheel is furnished. Wheel spindle is directly driven by a ¾-horsepower motor which has a standard speed of 3600



Colonial broach sharpener will take flat broaches up to 10 inches in width if broaches have straight teeth. For angled teeth width is slightly less



The crane traveling on its runway covers the length—the LiftAbout traveling on the crane beam covers the width.

● Shepard Niles single I-Beam Cranes are widely used in practically every industry for loads up to five tons capacity.

● This single I-Beam Crane combined with the new Shepard Niles LiftAbout will cover every square foot of the bay with vertical lifts, eliminating all side pulling and dragging of loads.

A COMPLETE LINE OF CRANES AND HOISTS

SHEPARD NILES CRANE & HOIST CORP.

358 SCHUYLER AVENUE
MONTOUR FALLS, N. Y.

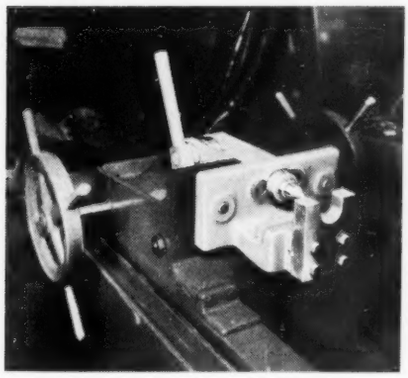
revolutions per minute. It is carried in adjustable, pre-loaded double row bearings and totally enclosed. Frequency changers permit operation of wheel spindle at speeds up to 10,800 revolutions per minute.

Maximum travel of the slide is 10 inches. Adjustable stops are supplied on the head and these are fitted with thumb screws permitting a vernier adjustment of the travel. Stops on the grinding head are being loaded to cushion both the head and wheel at the end of travel.

Sharpener table has a maximum travel of 60 inches with an overall of 72 inches. For work of extraordinary accuracy, a vernier work and wheel mechanism can be supplied to operate the main hand wheel permitting adjustments to 0.0002 inches. Table is carried on V and one flat guide, the latter being lubricated by rollers running in oil wells. Head stock, tail stock and steady rests are provided for grinding round and spline broaches.

Work Holding Fixture Assures Concentricity

■ Landis Machine Co., Waynesboro, Pa., has placed on the market a work holding fixture designed for use on threading machines. It provides an efficient and rapid method of locating work to assure concentricity between the thread and the work.



Traveling center of this Landis work holding fixture is located in the bore of the head to support the front end of the work, eliminating the possibility of chasers leading off center

Attachment consists of a travelling center, driving block and a locking center. Traveling center is located in the bore of the head to support the front end of the work, eliminating the possibility of chasers leading off center. A long, heavy spring also located in the bore of the die head spindle, maintains a constant pressure of the center against the work.

Locking center, located on the carriage directly back of a steel block which is cut out to conform to the shape of work it is to hold, provides the remainder of the supporting. This center is supported in a short spindle, the opposite end of which operates against a cam. Cam is mounted on a shaft at right angles to the spindle. One end of the shaft is milled to a hexagon shape and is equipped with a short handle.

When used in production, work is first located on the traveling center and then dropped into the steel block on the carriage. Cam handle is then pushed forward causing locking center to engage in the work and push it forward until a shoulder on the work rests against the back surface of the driving block.

Since the cam drives center spindle a positive locking action is attained the instant the work strikes the driving block. Adjustment is provided in that part of the attachment located on the carriage to permit both horizontal and vertical alignment of the locking center to center of rotation of die head.

Chucking Devices Are Power-Driven

■ Warner & Swasey Co., Cleveland, has introduced two chucking de-

Avoid Waste—Stop Oil Drip! From Overhead Crane Motors

Cost of lubricant and application are necessarily high when oil drips from crane motors. Bearings must be filled often to insure continuous lubrication.

Dripping lubricant wastes money in other ways. Time is consumed cleaning up tracks and pillars to eliminate fire hazard. Cost of cleaning stock is increased when heavy lubricant deposits must be removed.

Non-Fluid Oil stops such losses. It does not drip or leak—stays where put until entirely consumed—outlasts other lubricants 3 to 5 times.

Used successfully by leading steel plants

Send for testing sample today-prepaid-NO CHARGE!

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TRADE MARK NON-FLUID OIL REGISTERED IN U.S. PAT. OFFICE & FOREIGN COUNTRIES

MODERN STEEL MILL LUBRICANT

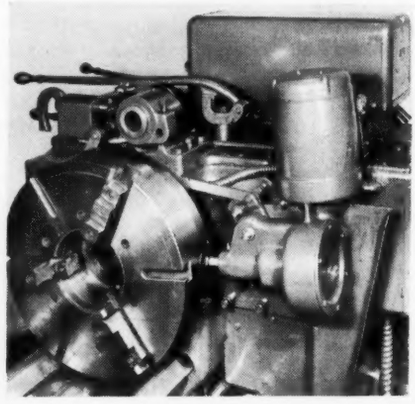
Better Lubrication at Less Cost per Month

vices which replace manual operation with power-driven equipment. One is a power-driven chuck wrench and the other is a power-operated bar chuck and feed mechanism.

Power chuck wrench can be attached by means of standard adapters to new saddle type machines or to similar type machines of near recent design. It can be used on chucks from 12 to 28 inches in diameter. A feature of the unit is the great variation of gripping pressure made possible by the use of a transformer with eight outlets of varying voltage. Gripping pressure is greater than that obtained with a hand wrench and slight enough to grip delicate work without crushing.

Unit is intended primarily for use with 3-jaw scroll chucks, but may be used with 4-jaw independent chuck or any chuck having radial wrench sockets. Operation of the wrench is simple. Operator stops the chuck, lining up a mark on its outside diameter with a pointer indicator on the machine. He then engages the square end of chuck wrench by pulling the handle toward him. Turning this handle to the left or right turns on the power that operates the unit. Interlocking unit provided between wrench and machine clutch lever makes it impossible to engage machine starting clutch without first withdrawing wrench from chuck pinion.

Elements of bar chuck and bar feed and sequence of operations for opening collet, feeding stock, closing collet and overhauling feed finger remain in the same form as for manual operation. This attachment simply substitutes a power drive, suitable timing control and stroke adjustment for hand operated levers of manually operated bar chuck and bar feed.



Gripping pressure of Warner & Swasey power, chuck wrench is greater than that obtained with a hand wrench, and slight enough to grip delicate work without causing distortion

Attachment is easily set up and adaptable for either first operation work in producing pieces from bar stock where the collet as well as bar feed must function, or second operation work, where no feeding motion is required and where collet must remain open at the end of cycle for insertion of new work piece. Shifting of selector lever sets device instantly for operation. Unit is operated by an independent fractional-horsepower electric motor. Coolant pump is driven from this motor instead of machine spindle.

Transformer Coils Cooled

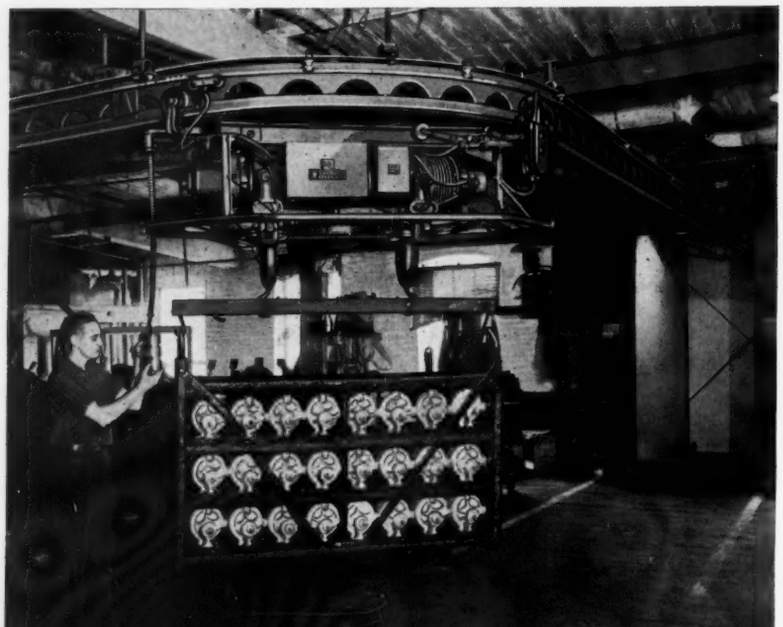
■ Giant Grip Mfg. Co., Oshkosh, Wis., has introduced an alternating current, portable welder which has a current range from 10 amperes to its maximum output.

Welder has open arc in three voltages, 80, 85 and 90. Voltage changes are easily accomplished by changing the leads in the box mounted on the side of the cabinet. Transformer coils are so constructed as to permit maximum cooling with the elimination of hot spots in the center of the coils and a forced air circulation. Knife switch control is provided and is located on the front of the cabinet.

CLEVELAND TRAMRAIL

MATERIALS HANDLING EQUIPMENT

For Manual or Motor Operation



● Rack loads of Partial Assemblies are raised from one floor to the next on this Push Button semi automatically controlled motor operated carrier and hoist — Safety features which close the hatchway are incorporated into this system.

ALSO BUILDERS OF

CLEVELAND CRANES

FOR EVERY INDUSTRY

CLEVELAND TRAMRAIL

Division of

THE CLEVELAND CRANE & ENGINEERING CO.

1125 Depot St.

WICKLIFFE, OHIO

Or consult your phone directory under Cleveland Tramrail.

Floor-Space Economy

(*Concluded from Page* 56)

caterpillar unit. The drive frame is mountetd on rollers in a stationary frame, and connected to it at one end are two heavy springs designed to withstand a force slightly in excess of the maximum expected chain pull. Under normal operation, drive will move back and forth slightly due to variations in load, thereby affording smooth operation of chain. If the latter should foul at any time, drive frame will run back against the spring pressure and trip a limit switch, automatically shutting off the power until the trouble is corrected. An automatic takeup is provided at the vertical dip immediately following the drive. (Fig. 2).

In the accompanying diagrammatic sketch (Fig. 4) path of the conveyor is shown clearly. After material has been cleaned thoroughly, it is placed in the proper container, located on a steel table alongside the conveyor and approximately one inch higher than the carrier level (Fig. 3). An operator places a full box of material on an empty carrier as it passes. Material which is too warm for inspection is removed from conveyor and stored in the enclosed section of the mezzanine floor, adjacent to the inspection room (Fig. 5). After it has cooled sufficiently, it is delivered to inspection tables on a gravity roller conveyor. Part of the material which has cooled by the time it reaches this storage area is unloaded directly on the inspection tables. After parts have passed inspection, they are placed in boxes at the end of the table ready for delivery to assembly room. Inspection and loading of parts are carried out in close co-operation with the assembly department to avoid excessive storage of parts after inspection.

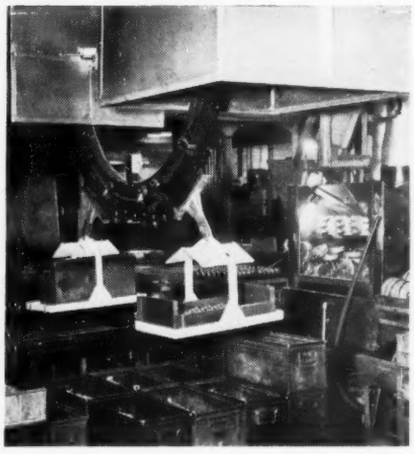
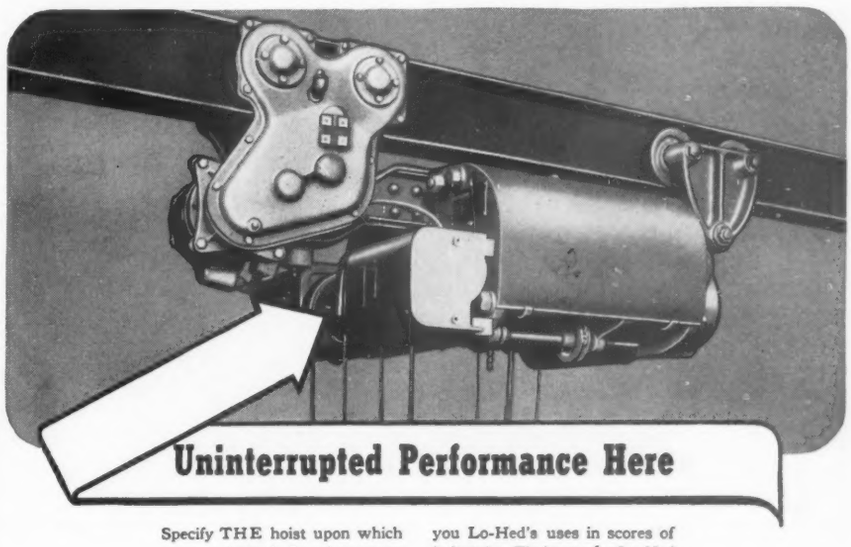


Fig. 6—Parts unloaded at vertical dip are washed and delivered to assembly line on a pallet conveyor

Several parts are unloaded at vertical dip outside of the glass-enclosed compressor assembly room, where they are washed in varsol and delivered to the assembly line on a pallet conveyor (Fig. 6). Balance of the parts is removed at an unloading dip which comes through ceiling of the assembly room at a point near where they are required (Fig. 5). Empty boxes and trays are delivered to machining section, where they are washed before being reused.

Cleanliness is one of the prime requisites to successful operation of the refrigerator compressor. To keep parts free from dust and dirt, conveyor is enclosed in a sheet-iron cover over a light steel framework at all points except at the loading and unloading stations on the main floor and at the enclosed inspection and assembly rooms which are supplied with filtered air. This enclosure can be seen in Figs. 2 and 4. The drive is located also in this dust-proof enclosure and is reached through doors in the side.



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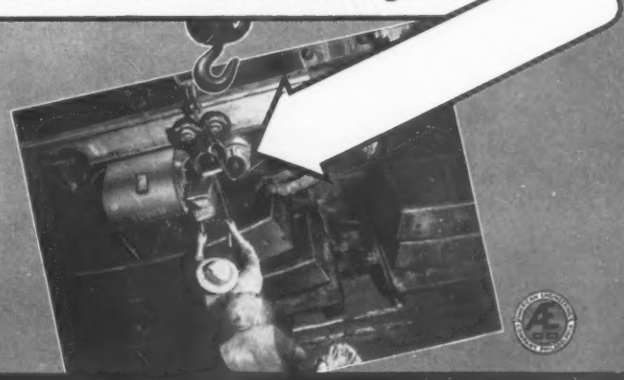
Means Continuous Handling Here



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A-E-CO Lo-Hed HOIST

AMERICAN ENGINEERING COMPANY

2484 ARAMINGO AVENUE, PHILADELPHIA, PA.

Bearings

(*Concluded from Page* 47)

bending test, and if the samples do not take the required amount of bend without breaking, the lot is rejected. Where this test cannot be applied, an impact test is made to assure the same condition. In this test a hammer of sufficient weight is dropped on the roller from a height which will give a permanent set in the way of flattening the roller and, unless the sample shows the required amount of shock resistance, the lot is rejected. Both the bending and impact tests are destructive tests for the samples used. These tests also give valuable information with regard to the proper heat treatment for the bearing races.

A special magnetic test for all surface defects was developed by Bantam, which makes use of a by-product from the manufacture of small rollers. This test unmistakably brings to light all defects in the steel at the surface and immediately below the surface. This test does no harm to the part tested, and all of the larger rollers and balls are checked individually by this method after finishing.

In the assembly of these large bearings, the inspection department and the assembly department work together closely to assure that each part is thoroughly checked for size, roundness and concentricity as it is put into the bearing assembly. All parts are again checked at this stage for the proper degree of hardness. All surfaces are checked for the proper finish. A complete record of each part is kept for future reference with a view to eliminating manufacturing difficulties, and to further improving the process. The assembled bearing is checked for the proper internal clearances, for concentricity, and for smoothness of operation. Each bearing is stamped with an individual number which is to serve as a means of checking its future service record against the record of its manufacture. A coat of grease is applied, and the bearing is thoroughly wrapped in oiled paper to keep out grit particles during the shipment and to prevent corrosion of the newly ground surfaces.

ATLAS GAS-ELECTRIC LOCOMOTIVES

45 Ton Locomotive especially suitable for economical interplant switching service.

OTHER ATLAS PRODUCTS

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THE ATLAS CAR & MFG. CO.

Engineers . . . Manufacturers

CLEVELAND, OHIO

Steel Combines Strength And Corrosion Resistance

■ A new type of high-strength flat-rolled steel has been placed on the market by Alan Wood Steel Co., Conshohocken, Pa. Its name, Dyn-El, is derived from its high dynamic and high elastic characteristics. Typical physical properties of Dyn-El are: Elastic limit, 58,000 pounds per square inch; tensile strength, 72,000 pounds per square inch; elongation in 2 inches, 28 per cent; reduction of area, 60 per cent.

The new product is said to be 50 per cent stronger than ordinary sheet steel and to have unusual resistance to corrosion. It also has high impact and fatigue resistance.

Dyn-El is intended for many uses, particularly in railroad rolling stock, trucks and busses as it permits reduction in dead load and increased strength.

Low Price Asked For Safety Booklet

■ To secure wider distribution of its book entitled, "Eye Hazards in Industrial Occupation" by Louis Resnick and Lewis H. Carris, National Society for the Prevention of Blindness, 50 West Fiftieth street, New York, is now offering copies at a special price of 50 cents as long as the supply lasts.

This book, which was formerly sold for $1.50 was published in 1924. Although some of the photographs show safety devices which have since been improved upon, its contents of 247 pages still are a valuable guide to safe practices in industry.

General Buying Aids Steady Rise in Steel Output

Pig Iron Gains; Scrap Is Weaker; Imports in Drop

■ MISCELLANEOUS buyers of steel products are contributing sufficient tonnage to continue the slow rise of production despite absence from the market of the three leading consuming industries, automobiles, railroads and structural fabricators.

Little immediate support can be expected from the automobile industry. Some builders plan to end production of present models as early as June, with steel supplies nearly sufficient for their needs. Work on 1939 models is being advanced to start the new season earlier than usual.

Railroads show no inclination to buy and the market at present is clear of inquiry. New York Central is nearly ready to issue its rail requirements, which usually are out much earlier.

An increase of about 10 per cent in general buying was experienced during March, some steelmakers, fortunate in booking a few large orders, attaining 20 per cent more than in February. Bars have been most active among heavier products. Some platemakers booked less business in March than February.

Galvanized sheets are in good demand, leading the lighter forms of steel. Wire is also active, with sheets and strip doing fairly well, despite absence of automobile and radio demand.

With the same number of stacks active as in the preceding two months daily average production of pig iron in March gained 2.5 per cent over February. March daily average was 47,851 tons, compared with 46,665 tons in February. Total output in March was 1,483,368 tons, compared with 1,306,333 tons in February, an increase of 13.5 per cent. For first quarter total production was 4,234,563 tons, compared with 9,710,217 tons for the same period of 1937, a decline of 56.5 per cent.

Continued small increases in production rates, with minor reductions at two points, carried the national operating rate up 1 point last week to 36 per cent, which is the highest level since the second week in November, when it was 39 per cent. Pittsburgh advanced 2 points to 32 per cent, Chicago 1 point to 32.5, Youngstown 1 point to 30, Cleveland 1.7 point to 33.5, New England 2 points to 20 and St. Louis 9 points to 46.5. No change was made in Eastern Pennsylvania at 29 per cent, Wheeling at 41, Buffalo at 30 and Birmingham at 66. Cincinnati dropped 27 points to 18 per cent, following its staggered schedule, and Detroit 9 points to 18 per cent. Schedules for this week at several points call for higher rates.

Some fairly good tonnages of structurals were closed last week, practically all for public work. Sheet piling totaling 2500 tons for a navy waterfront improvement at Alameda, Calif., has been placed; 2500 tons for a bridge in connection with the West Side elevated highway in New York; 2420 tons for a bridge over Trinity river, Texas; 1575 tons for a Washington-Idaho state bridge over Snake river; 1350 tons for a building for the World's Fair, New York. Westinghouse Electric & Mfg. Co., is considering bids on 2000 tons for a building at Springfield, Mass.; rebuilding of Manhattan bridge, New York, calls for 3600 tons and various tunnel, bridge and approach needs in the New York area involved 8850 tons.

Steel and iron imports in February were 19,589 tons, 33.4 per cent smaller than in January. For two months the total was 37.9 per cent below the corresponding months of 1937. This is an unusual condition in the face of increasing exports and results from heavy demand from Europe and the Far East, which absorbs the export tonnage of countries ordinarily selling in the United States.

Automobile production gained 2100 units last week over the previous period, to a total of 58,900. Chrysler and Ford increased assemblies but General Motors and smaller builders fell off slightly. General Motors completed 21,930, compared with 23,160 the previous week; Chrysler 14,575 compared with 12,225; Ford 14,385 against 12,060; all others 8010 against 9335.

Weakness in scrap at Chicago, where steelmaking grades declined 50 cents, and a smaller recession in Eastern Pennsylvania, brought the composite price of scrap down 21 cents, to $13. This is the lowest level since the first week in December. The iron and steel composite declined 4 cents, to $38.71, for the same reason. The finished steel composite is steady at $61.70.

COMPOSITE MARKET AVERAGES

	April 2	Mar. 26	Mar. 19	One Month Ago Mar., 1938	Three Months Ago Jan., 1938	One Year Ago Apr., 1937	Five Years Ago Apr., 1933
Iron and Steel	$38.71	$38.75	$38.78	$38.80	$38.95	$40.39	$27.78
Finished Steel	61.70	61.70	61.70	61.70	61.70	61.45	44.94
Steelworks Scrap..	13.00	13.21	13.25	13.20	13.85	21.27	7.23

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	April 2, 1938	March 1938	Jan. 1938	April 1937
Steel bars, Pittsburgh	2.45c	2.45c	2.45c	2.45c
Steel bars, Chicago	2.50	2.50	2.50	2.50
Steel bars, Philadelphia	2.75	2.75	2.75	2.74
Iron bars, Terre Haute, Ind.	2.35	2.35	2.35	2.35
Shapes, Pittsburgh	2.25	2.25	2.25	2.25
Shapes, Philadelphia	2.465	2.465	2.465	2.455
Shapes, Chicago	2.30	2.30	2.30	2.30
Tank plates, Pittsburgh	2.25	2.25	2.25	2.25
Tank plates, Philadelphia	2.445	2.445	2.445	2.435
Tank plates, Chicago	2.30	2.30	2.30	2.30
Sheets, No. 10, hot rolled, Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, hot ann., Pitts.	3.15	3.15	3.15	3.15
Sheets, No. 24, galv., Pitts.	3.80	3.80	3.80	3.80
Sheets, No. 10, hot rolled, Gary	2.50	2.50	2.50	2.50
Sheets, No. 24, hot anneal., Gary	3.25	3.25	3.25	3.25
Sheets, No. 24, galvan., Gary	3.90	3.90	3.90	3.90
Plain wire, Pittsburgh	2.90	2.90	2.90	2.90
Tin plate, per base box, Pitts.	$5.35	$5.35	$5.35	$5.25
Wire nails, Pittsburgh	2.75	2.75	2.75	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$37.00	$37.00	$37.00	$37.00
Sheet bars, open-hearth, Pitts.	37.00	37.00	37.00	37.00
Billets, open-hearth, Pittsburgh	37.00	37.00	37.00	37.00
Wire rods, No. 5 to 9/32-inch, Pitts.	47.00	47.00	47.00	47.00

Pig Iron

	April 2, 1938	March 1938	Jan. 1938	April 1937
Bessemer, del. Pittsburgh	$25.26	$25.26	$25.26	$25.26
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern del. East. Pa.	25.34	25.34	25.34	25.26
No. 2 fdry., Pittsburgh	25.21	25.21	25.21	25.21
No. 2 fdry., Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	23.89	23.89	23.89	23.69
No. 2X eastern, del. Phila.	26.215	26.215	26.215	26.135
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	30.34	30.24	30.24	30.04
Gray forge, del. Pittsburgh	24.17	24.17	24.17	24.17
Ferromanganese, del. Pittsburgh	107.77	107.49	107.49	99.79

Scrap

Heavy melting steel, Pittsburgh	$13.50	$13.65	$14.05	$22.75
Heavy melt. steel, No. 2, E. Pa.	13.00	12.75	13.75	19.06
Heavy melting steel, Chicago	11.75	12.20	13.25	20.75
Rails for rolling, Chicago	15.25	15.25	14.90	23.35
Railroad steel specialties, Chicago	13.75	14.25	15.75	23.75

Coke

Connellsville, furnace, ovens	$4.25	$4.25	$4.25	$4.50
Connellsville, foundry, ovens	5.25	5.25	5.25	5.05
Chicago, by-product foundry, del.	11.00	11.00	11.00	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Prices Subject to Quantity Extras and deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, del.	2.60c
New York, del.	2.74c
Philadelphia, del.	2.70c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pac. base pts. f.o.b. cars	2.97½c

Hot Rolled Annealed No. 24

Pittsburgh	3.15c
Gary	3.25c
Chicago, delivered	3.28c
Detroit, delivered	3.35c
New York, delivered	3.49c
Philadelphia, del.	3.45c
Birmingham	3.30c
St. Louis, del.	3.38c
Granite City, Ill.	3.35c
Pac. base pts. f.o.b. cars	3.82½c

Galvanized No. 24

Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93c
Philadelphia, del.	4.10c
New York, delivered	4.14c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.00c
Pac. base pts. f.o.b. cars	4.42½c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
St. Louis, delivered	3.53c
Granite City, Ill.	3.50c

Cold Rolled No. 10

Pittsburgh	3.00c
Gary	3.10c
Detroit, delivered	3.21c
Philadelphia, del.	3.30c
New York, del.	3.34c
St. Louis, del.	3.23c
Granite City, Ill.	3.20c
Pac. base pts. f.o.b. cars	3.62½c

Cold Rolled No. 20

Pittsburgh	3.45c
Gary	3.55c
Detroit, delivered	3.66c
Philadelphia, del.	3.75c
New York, del.	3.79c
St. Louis	3.68c
Granite City, Ill.	3.65c

Enameling Sheets

Pittsburgh, No. 10	2.90c
Pittsburgh, No. 20	3.50c
Gary, No. 10	3.00c
Gary, No. 20	3.60c
St. Louis, No. 10	3.13c
St. Louis, No. 20	3.73c

Tin and Terne Plate

Gary base, 10 cents higher

Tin plate, coke (base box) Pittsburgh	$5.35
Waste-waste, 2.80c; strip	2.50c
Long ternes, No. 24, unassorted, Pitts.	4.10c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.25c
New York, del.	2.54c
Philadelphia, del.	2.44½c
Boston, delivered	2.66c
Buffalo, delivered	2.49½c
Chicago or Gary	2.30c
Cleveland, del.	2.45½c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
Pacific basing points, f.o.b. cars	2.82½c
St. Louis, delivered	2.54c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.46½c
New York, del.	2.51¼c
Boston, delivered	2.64½c
Bethlehem	2.35c
Chicago	2.30c
Cleveland, del.	2.46c
Buffalo, delivered	2.37½c
Gulf Ports	2.66c
Birmingham	2.40c
Pacific coast basing pts., f.o.b. cars	2.82½c
St. Louis, del.	2.54c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.45c
Chicago or Gary	2.50c
Duluth	2.60c
Birmingham	2.60c
Cleveland	2.50c
Buffalo	2.55c
Detroit, delivered	2.60c
Pacific coast basing pts., f.o.b. cars	3.02½c
Philadelphia, del.	2.75c
Boston, delivered	2.86c
New York, del.	2.79c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.30c
Chicago or Gary	2.35c
Cleveland	2.35c
Moline, Ill.	2.35c
Buffalo, delivered	2.37½c
Birmingham	2.45c

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.64c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.45c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.50c
Gulf ports	2.85c
Pacific coast ports, f.o.b. car docks	2.95c
Philadelphia, del.	2.75c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	2.30c
Chicago, Buffalo, Cleveland, Birm., Young.	2.35c
Gulf ports	2.80c

Wire Products

Prices apply to mixed carloads, base; less carloads subject to quantity extras.

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.75
Cement coated nails	$2.75

(Per pound)

Polished staples	3.45c
Galv. fence staples	3.70c
Barbed wire, galv.	3.40c
Annealed fence wire	3.15c
Galv. fence wire	3.55c
Woven wire fencing (base C. L. column)	.74
Single loop bale ties, (base C. L. column)	.63

To Manufacturing Trade

Plain wire, 6-9 ga.	2.90c
Galvanized wire	2.95c
Anderson, Ind. (merchant products only) and Chicago up $1; Duluth and Worcester up $2; Birmingham up $3.	
Spring wire, Pitts. or Cleveland	3.50c
Do., Chicago up $1, Worc. $2.	

Cold-Finished Carbon Bars, Shafting

Pittsburgh	2.90c
Chicago	2.95c
Gary, Ind.	2.95c
Detroit	2.95c
Cleveland	2.95c
Buffalo	3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 3.00c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring 0.15
6100 bars 1.20
6100 spring 0.85
Cr. N., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40

Piling

Pittsburgh	2.60c
Chicago, Buffalo	2.70c

Strip and Hoops

(Base, hot-rolled, 25-1 ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23⅛-in.	
Pittsburgh	2.40c
Chicago or Gary	2.50c
Birmingham base	2.55c
Detroit, del.	2.61c
Philadelphia, del.	2.70c
New York, del.	2.74c
Cooperage hoop,	
Pittsburgh	2.50c
Chicago	2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland	3.20c
Detroit, del.	3.41c
Worcester, Mass.	3.40c

Carbon	Cleve. Pitts.	Worcester, Mass.
0.26—0.50	3.20c	4.30c
0.51—0.75	4.45c	4.65c
0.76—1.00	6.30c	6.50c
Over 1.00	8.50c	8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pittsburgh, Chicago	$43.00
Do., rerolling quality	42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.80c
Do., axle steel	2.35c
Spikes, R. R. base	3.15c
Track bolts, base	4.35c
Tie plate, base	$46.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:

Carriage and Machine

½ x 6 and smaller	65-5 off
Do. larger, to 1-in.	60-10 off
Do. 1⅛ and 1¼-in.	60-5 off
Tire bolts	50 off

Plow Bolts

All sizes	65-5 off

Stove Bolts

In packages with nuts attached 70 off; in packages with nuts separate 70-10 off; in bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5 off
Elevator bolts	50-10-5 off

Nuts

S. A. E. semifinished hex.: ½ to ⅞-inch	60-10 off
Do., 9/16 to 1-inch	60-5 off
Do., over 1-inch	60 off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland	3.60c
Structural, Chicago	3.70c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-5 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75	off

Cut Nails

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts, Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	59½	49
¼	62½	53
1—3	64½	55½

Iron

¼	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld

Steel

2	57	47½
2½—3	60	50½
3½—6	62	52½
7 and 8	61	50½
9 and 10	60½	50

Iron

2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9—12	24½	10

Line Pipe

Steel

1 to 3, butt weld	63½
2, lap weld	56
2½ to 3, lap weld	59
3½ to 6, lap weld	61
7 and 8, lap weld	60
10-inch, lap weld	59½
12-inch, lap weld	58½

Butt Weld

Iron

	Blk.	Galv.
¾	25	7
1 and 1¼	29	13
1½	33	15½
2	32½	15

Lap Weld

1½	23½	7
2	25½	9
2½ to 3½	26½	11½
4	28½	15
4½ to 8	27½	14
9 to 12	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Weld

Sizes	Steel	Charcoal Iron
1½" OD x 13 Ga.	$10.45	$23.71
1¾" OD x 13 Ga.	11.89	22.93
2" OD x 13 Ga.	13.31	19.35
2" OD x 11 Ga.	15.49	23.36
2¼" OD x 13 Ga.	14.82	21.68
2¼" OD x 11 Ga.	17.38	26.02
2½" OD x 12 Ga.	17.82	26.57
2¾" OD x 12 Ga.	18.86	29.00
3" OD x 12 Ga.	19.73	31.36
3½" OD x 11 Ga.	24.89	39.81
4" OD x 10 Ga.	30.81	49.90
5" OD x 9 Ga.	47.57	73.93
6" OD x 7 Ga.	73.25	....

Seamless

	Hot Rolled	Cold Drawn
1" OD x 13 Ga.	$ 8.41	$ 9.46
1¼" OD x 13 Ga.	9.96	11.21
1½" OD x 13 Ga.	11.00	12.38
1¾" OD x 13 Ga.	12.51	14.09
2"OD x 13 Ga.	14.02	15.78
2¼" OD x 13 Ga.	15.63	17.60
2¼" OD x 12 Ga.	17.21	19.37
2½" OD x 12 Ga.	18.85	21.22
2¾" OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga.	20.97	23.60
4½" OD x 10 Ga.	40.15	45.19
3½" OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga.	32.83	36.94
5" OD x 9 Ga.	50.38	56.71
6" OD x 7 Ga.	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$46.00-47.00
4-in., Birmingham	49.00-50.00
4-in., Chicago	57.80-58.80
6 to 24-in., Chicago	54.80-55.80
6-in. & over, east fdy.	50.00
Do., 4-in.	53.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., Buffalo, Young., Birm.	$37.00
Philadelphia	42.30
Duluth	39.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	43.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleve., Young Sparrows Point	37.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	37.00

Wire Rods

Pitts., Cleve., No. 5 to ⅝-inch incl.	47.00
Do., over ⅝ to 41/64-inch incl.	52.00

Chicago up $1; Worcester up $2.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	2.10c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.00- 4.50
Connellsville, fdry.	5.00- 5.50
Connell. prem. fdry	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.75- 6.00
Wise county fur.	4.75- 5.00

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	10.25
Chicago, del.	11.00
Milwaukee, ovens	11.00
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.50
Indianapolis, del.	10.50
Cincinnati, del.	10.50
Cleveland, del.	11.05
Buffalo, del.	10.50
Detroit, del.	11.10
Philadelphia, del.	10.63

Coke By-Products

Spot, gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls. to jobbers	6.75c

Per ton, bulk, f.o.b. oven or port

Sulphate of ammonia	$29.50

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malle-able	Basic	Besse-mer
Bethlehem, Pa.	$25.00	$25.50	$23.50	$26.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Birmingham, Ala.‡	20.38	.....	19.38	25.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrow's Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham	25.78	.....	24.66	.....
Boston from Birmingham	26.57	.....	26.07	.....
Boston from Everett, Mass.	26.30	26.80	25.80	27.30
Boston from Buffalo	26.45	26.95	25.95	27.45
Brooklyn, N. Y., from Bethelehem	27.47	27.97	.....	.....
Brooklyn, N. Y., from Bmghm.	27.25	.....	.....	.....
Canton, O., from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	.....	.....	.....
Cincinnati from Hamilton, O.	24.44	25.11	24.78	.....
Cincinnati from Birmingham	24.06	.....	23.06	.....
Cleveland from Birmingham	24.32	.....	23.82	.....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	25.44
Milwaukee from Chicago	25.10	25.10	24.60	25.10
Muskegon, Mich., from Chicago, Toledo or Detroit	27.10	27.10	26.60	27.60
Newark, N. J., from Birmingham	26.21	.....	.....	.....
Newark, N. J., from Bethlehem	26.53	27.03	.....	.....
Philadelphia from Birmingham	25.46	.....	24.96	.....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	.....
Pittsburgh district from Neville Island	Neville, base plus 63c, 76c, and $1.13 switch'g charges			
Saginaw, Mich., from Detroit	26.45	26.45	25.95	25.95
St. Louis, northern	24.55	24.55	24.05	.....
St. Louis from Birmingham	†24.12	.....	23.82	.....
St. Paul from Duluth	26.08	26.08	.....	26.58

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $28.50, Phil. base, standard and copper bearing, $29.63.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.34
		Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	41.80
New Jersey	51.00

Ohio

First quality	43.70
Intermediate	39.90
Second quality	35.15

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	59.85
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$30.00
Wire cut	$28.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	43.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$49.00
Chem. bonded chrome	49.00
Magnesite brick	69.00
Chem. bonded magnesite	59.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$20.00
Do., for barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty pd.	$102.50
Do., Baltimore, base	102.50
Do., del. Pittsburgh	107.49
Spiegeleisen, 19-21% dom. Palmerton, Pa., spot	33.00
Do., New Orleans	33.00
Do., 26-28%, Palmerton	39.00
Ferrosilicon, 50% freight allowed, c.l.	69.50
Do., ton lot	80.50
Do., 75 per cent	126.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	106.50
2% carbon 111.50; 1%,	121.50
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.50
Ferrotungsten, stand., lb. con. del. cars	1.90-2.00
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod-plant, frt. all., net ton	142.50
Contract, ton lots	145.00
Spot, ton lots	150.00
Ferrophosphorus, per ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb. f.o.b. mill	0.95
Molybdate, lb. cont. f.o.b. mill	0.80
Technical molybdenum trioxide, 53 to 60% molybdenum, f.o.b. mill	0.80

†Carloads. Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Alumi-num 99%	Antimony American Spot, N. Y.	Nickel Cath-odes
Mar. 26	10.00	10.12½	9.52½	40.87½	40.95	4.50	4.35	4.25	20.00	13.75	35.00
Mar. 28	10.00	10.12½	9.52½	40.87½	41.05	4.50	4.35	4.25	20.00	13.75	35.00
Mar. 29	10.00	10.12½	9.52½	40.37½	40.50	4.50	4.35	4.25	20.00	13.75	35.00
Mar. 30	10.00	10.12½	9.52½	39.00	39.10	4.50	4.35	4.25	20.00	13.75	35.00
Mar. 31	10.00	10.12½	9.52½	38.00	38.05	4.50	4.35	4.25	20.00	13.75	35.00
April 1	10.00	10.12½	9.52½	39.00	39.15	4.50	4.35	4.25	20.00	13.75	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 10.00c Conn. copper

Sheets

Yellow brass (high)	16.37½
Copper, hot rolled	18.12½
Lead, cut to jobbers	7.75
Zinc, 100-lb. base	10.00

Tubes

High, yellow brass	19.12½
Seamless copper	18.62½

Rods

High yellow brass	12.37½
Copper, hot rolled	14.62½

Anodes

Copper, untrimmed	15.37½

Wire

Yellow brass (high)	16.62½

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

*New York	5.35-5.60
Cleveland	6.50-6.75
*Chicago	5.37½-5.62½
St. Louis	5.50-5.75

Heavy Copper and Wire

*New York, No. 1	6.12½-6.37½
*Cleveland, No. 1	7.00-7.25
*Chicago, No. 1	7.00-7.25
St. Louis	7.00-7.50

Composition Brass Borings

*New York	5.35-5.60

Light Copper

*New York	4.12½-4.37½
*Cleveland	5.25-5.50
*Chicago	5.12½-5.37½
St. Louis	5.00-5.25

Light Brass

Cleveland	3.25-3.50
*Chicago	3.37½-3.62½
*St. Louis	3.25-3.50

Lead

New York	3.50-3.75
Cleveland	3.25-3.50
Chicago	3.00-3.25
*St. Louis	3.00-3.50

Zinc

New York	1.87½-2.00
Cleveland	1.75-2.00
St. Louis	1.87½-2.00

Aluminum

Borings, Cleveland	5.25-5.50
Mixed cast. Cleve.	8.25-8.50
Clips, soft, Cleve.	11.75-12.00
*Mixed cast, St. L.	8.25-8.50

SECONDARY METALS

Brass, ingot, 85-5-5-5, lcl.	10.25
Stand, No. 12 alum.	15.75-16.25

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-In. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled No. 10	Sheets Hot Roll Ann. No. 24	Sheets Galv. No. 24
Boston	4.26	4.46	5.46	4.11	4.10	5.76	4.21	4.96	5.16
New York (Metropolitan)	4.12	4.32	4.32	4.00	3.97	5.60	4.07	4.50	5.00
Philadelphia	4.00	4.10	4.35	3.90	3.90	5.25	4.00	4.65	4.90
Baltimore	4.00	4.20	4.45	3.90	3.90	5.50	3.95	4.50	4.70
Norfolk, Va.	4.15	4.35	4.60	4.05	4.05	5.65	4.10	4.70	5.35
Buffalo	3.90	4.25	4.25	3.95	3.80	5.55	4.00	4.83	5.38
Pittsburgh	3.80	4.00	4.00	3.70	3.70	5.30	3.75	4.50	5.15
Cleveland	3.75	4.16	4.16	3.86	3.86	5.46	3.91	4.66	5.31
Detroit	3.935	4.185	4.185	3.95	3.95	5.55	3.935	4.685	5.40
Cincinnati	4.07	4.29	4.29	3.99	3.99	5.59	4.04	4.79	5.44
Chicago	3.85	4.10	4.10	3.75	3.75	5.35	3.85	4.60	5.25
Minneapolis	4.10	4.35	4.35	4.00	4.00	5.60	4.10	4.75	5.25
Milwaukee	3.96	4.21	4.21	3.86	3.86	5.46	3.96	4.71	5.36
St. Louis	4.09	4.34	4.34	3.99	3.99	5.59	4.09	4.84	5.49
Kansas City	4.34	4.59	4.59	4.24	4.24	5.84	4.10	4.85	5.50
Memphis	4.35	4.55	4.55	4.25	4.25	5.91	4.30	5.05	5.70
Chattanooga	4.21	4.41	4.41	4.11	4.11	5.91	4.16	4.06	4.66
Tulsa, Okla.	4.79	5.04	5.04	4.69	4.69	6.29	4.79	5.54	6.19
Birmingham, Ala.	3.85	4.05	4.05	3.75	3.75	5.96	3.80	4.55	5.20
New Orleans	4.10	4.65	4.65	4.00	4.00	5.95	4.25	4.75	5.15
Houston, Tex.	3.75	6.15	6.55	4.25	4.25	6.15	4.50	5.25	5.65
Seattle	4.45	4.95	6.30	4.25	4.25	6.00	4.50	5.35	5.90
Portland, Oreg.	4.45	4.95	6.30	4.25	4.25	6.00	4.50	5.15	5.90
Los Angeles	4.30	4.80	6.55	4.30	4.30	6.20	4.50	5.00	5.25
San Francisco	4.20	4.80	6.50	4.05	4.05	5.55	4.30	5.15	5.55

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.86	4.71	4.56	8.00	6.55	6.30	8.40	9.02	7.57
New York	3.92	4.57	4.32	7.82	6.37	6.12	9.52	9.00	7.55
Philadelphia	3.88	4.53	4.25	....	....	....	9.49	....	....
Baltimore	....	4.50	4.15	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.82	4.35	4.10	7.60	6.15	5.90	8.00	8.60	8.15
Pittsburgh	....	4.15	3.95	7.70	6.25	8.50	9.10	8.70	7.25
Cleveland	3.60	4.30	3.95	7.78	6.33	6.33	8.18	8.60	7.15
Detroit	3.78	4.30	4.085	7.89	6.44	6.19	7.74	8.88	7.43
Cincinnati	....	4.52	4.07	7.91	6.46	6.21	9.31	8.92	7.47
Chicago	3.87	4.30	4.05	7.60	6.15	5.90	8.00	8.60	7.15
Minneapolis	....	4.77	4.25	7.95	6.50	8.97	9.57	9.17	7.72
Milwaukee	....	4.41	4.16	7.81	6.36	6.11	8.21	8.81	7.36
St. Louis	3.96	4.54	4.29	7.94	6.49	6.24	8.34	8.94	7.49
Kansas City	4.37	4.79	....	....	....	....	....	....	....
Memphis	....	4.86	....	....	....	....	....	....	....
Chattanooga	....	4.86	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.24	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.85	6.05	....	8.00	8.00	8.65	....	....
Portland, Oreg.	....	5.85	5.85	9.00	8.00	7.85	8.70	....	....
Los Angeles	5.96	6.85	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	9.30	6.80	5.20	9.65	8.80	8.65	9.30	10.65	9.80

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, March 31

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons: Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$27.28 5 10 0	$18.09	2 5 0
Basic bessemer	....	....	.....
Hematite, Phos. .03-.05	32.31 6 10 0*	17.89	2 4 6
Billets	$39.14 7 17 6	$43.22	5 7 6
Wire rods, No. 5 gage	56.04 11 5 6	40.20	5 0 0
Standard rails	$50.32 10 2 6	$46.23	5 15 0
Merchant bars	2.61c 11 15 0	1.90c	5 5 0
Structural shapes	2.36c 10 12 6	1.77c	4 17 6
Plates, †¼ in. or 5 mm.	2.57c 11 11 3	2.23c	6 2 6
Sheets, black, 24 gage or 0.5 mm.	3.11c 14 0 0	2.82c	7 15 0°
Sheets, gal., 24 ga., corr.	3.72c 16 15 0	3.45c	9 10 0
Bands and strips	2.94c 13 5 0	1.82c	5 0 0
Plain wire, base	4.33c 19 10 0	2.23c to 2.64c	6 2 6 to 7 5 0
Galvanized wire, base	5.16c 23 5 0	2.85c to 2.95c	7 17 6 to 8 2 6
Wire nails, base	4.11c 18 10 0	2.54c to 2.72c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 5.59 1 2 6	.....	.....

British ferromanganese $102.50 delivered Atlantic seaboard, duty-paid

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$27.09	5 9 0(a)	$17.24	563.50	$21.97	650	$25.30 63
Basic bess. pig iron	24.85	5 0 0(a)	.....	.....	.....	...	27.91 (b) 69.50
Furnace coke	8.08	1 12 6	5.78	189	7.27	215	7.63 19
Billets	39.14	7 17 6	25.70	840	32.44	960	38.75 96.50
Standard rails	2.25c	10 2 6	1.61c	1,150	2.06c	1,375	2.38c 132
Merchant bars	2.54c	11 9 0	1.51c	1,080	1.65c	1,100	1.98c 110
Structural shapes	2.45c	11 0 6	1.48c	1,055	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm.	2.60c	11 14 3	1.89c	1,350	2.06c	1,375	2.29c 127
Sheets, black	3.50c	15 15 0§	2.19c	1,565‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	4.11c	18 10 0	3.15c	2,250	4.50c	3,000	6.66c 370
Plain wire	4.33c	19 10 0	2.32c	1,660	2.48c	1,650	3.11c 173
Bands and strips	2.71c	12 4 0	1.69c	1,210	2.32c	1,550	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed.

**Gold pound sterling carries a premium of 65.2 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	10.00
Birmingham, No. 2.	9.00
Bos. dock No. 1 exp.	12.50-13.00
N. Eng. del. No. 1..	12.50
Buffalo, No. 1	12.50-13.00
Buffalo, No. 2	10.50-11.00
Chicago, No. 1.....	11.50-12.00
Cleveland, No. 1...	11.00-11.50
Cleveland, No. 2...	10.00-10.50
Detroit, No. 1	7.00- 7.50
Eastern Pa., No. 1..	14.00-15.00
Eastern Pa., No. 2..	12.00-13.50
Federal, Ill.	10.00-11.50
Granite City, R. R..	11.00-11.50
Granite City, No. 2	10.00-10.50
Los Angeles, No. 1	13.50-14.00
Los Angeles, No. 2	12.00-12.50
New York, No. 1....	†11.00
N. Y. dock No. 1 exp.	12.50
Pitts., No. 1 (R. R.)	14.25-15.25
Pitts., No. 1 (dlr.)..	13.25-13.75
Pittsburgh, No. 2...	12.50-13.00
St. Louis, R. R.....	11.00-11.50
St. Louis, No. 2 ...	10.00-10.50
San Francisco, No. 1	10.00
Seattle, No. 1	8.00
Toronto, dlrs. No. 1	10.00
Valleys, No. 1	13.25-13.75

COMPRESSED SHEETS

Buffalo, dealers ..	10.50-11.00
Chicago, factory ...	10.25-10.75
Chicago, dealer ...	9.50-10.00
Cleveland	10.50-11.00
Detroit	8.50- 9.00
E. Pa., new mat. ...	14.00-15.00
E. Pa., old mat.	9.50-10.00
Los Angeles	12.50-13.00
Pittsburgh	13.25-13.75
St. Louis	6.75- 7.25
Valleys	12.00-12.50

BUNDLED SHEETS

Buffalo	11.50
Cincinnati, del.	8.50- 9.00
Cleveland	7.50- 8.00
Los Angeles	11.00-11.50
Pittsburgh	12.00-12.50
St. Louis	6.00- 6.50
Toronto, dealers ...	7.00

SHEET CLIPPINGS, LOOSE

Chicago	7.25- 7.75
Cincinnati	5.00- 5.50
Detroit	5.25- 5.75
†Los Angeles	3.75- 4.00
St. Louis	5.00- 5.50

STEEL RAILS, SHORT

Birmingham	15.00
Buffalo	17.50-18.00
Chicago (3 ft.)	14.50-15.00
Chicago (2 ft.)	15.00-15.50
Cincinnati, del.	16.50-17.00
Detroit	13.50-14.00
Los Angeles	15.00-17.50
Pitts., 3 ft. and less	17.50-18.00
St. Louis, 2 ft. & less	14.50-15.00

STEEL RAILS, SCRAP

Boston district	†11.00
Buffalo	15.50-16.00
Chicago	11.50-12.00
Cleveland	16.00-16.50
Pittsburgh	15.25-15.75
St. Louis	12.00-12.50
Seattle	10.00

STOVE PLATE

Birmingham	8.00- 8.50
Boston, district	†8.25- 8.50
Buffalo	10.50-11.00
Chicago, net	7.50- 8.00
Cincinnati, dealers..	6.50- 7.00
Detroit, net	7.50- 8.00
Eastern Pa.	12.50-13.00
New York, fdry.....	†8.00- 8.50
St. Louis	7.00- 7.50
Toronto, deal'rs, net	9.00

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	16.00-16.50
Chicago, leaf	14.00-14.50
Eastern Pa.	17.00-17.50
Pittsburgh	17.50-18.00
St. Louis	14.50-15.00

ANGLE BARS—STEEL

Chicago	13.50-14.00
St. Louis	12.00-12.50

RAILROAD SPECIALTIES

Chicago	13.50-14.00

LOW PHOSPHORUS

Buffalo, crops	17.00-17.50
Cleveland, crops ...	19.50-20.50
Eastern Pa., crops..	18.50-19.00
Pittsburgh, crops..'	17.50-18.50

FROGS, SWITCHES

Chicago	11.50-12.00
St. Louis, cut	12.00-12.50

SHOVELING STEEL

Federal, Ill.	10.00-10.50
Granite City, Ill....	10.00-10.50
Los Angeles	15.00-16.50
Toronto, dealers....	8.00

RAILROAD WROUGHT

Birmingham	11.00-11.50
Boston district	†9.00- 9.50
Chicago, No. 1 net..	8.50- 9.00
Cincinnati, No. 2 ..	9.00- 9.50
Eastern Pa., No. 1..	15.50-16.00
St. Louis, No. 1	8.25- 8.75
St. Louis, No. 2....	11.00-11.50
Toronto, No. 1 dlr...	16.00

SPECIFICATION PIPE

Eastern Pa.	14.00-14.50
New York	†9.00- 9.50

BUSHELING

Buffalo, No. 1	10.50-11.00
Chicago, No. 1	10.00-10.50
Cincin., No. 1, deal..	7.50- 8.00
Cincinnati, No. 2...	3.00- 3.50
Cleveland, No. 2 ...	6.50- 7.00
Detroit, No. 1, new	7.00- 7.50
Valleys, new, No. 1	12.00-12.50
Toronto, dealers....	7.00

MACHINE TURNINGS

Birmingham	6.00- 7.00
Buffalo	6.25- 6.75
Chicago	6.00- 6.50
Cincinnati, dealers..	3.50- 4.00
Cleveland	6.50- 7.00
Detroit	3.50- 4.00
Eastern Pa.	7.00- 7.25
Los Angeles	4.00- 4.25
New York	†3.50
Pittsburgh	7.00- 7.50
St. Louis	3.75- 4.25
Toronto, dealers....	7.00
Valleys	9.50-10.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†1.85
Buffalo	6.50- 7.00
Cincinnati, dealers..	3.00- 3.50
Cleveland	6.50- 7.00
Detroit	4.50- 5.00
Eastern Pa.	6.50- 7.00
New York	†3.50- 4.00
Pittsburgh	6.00- 6.50
Toronto, dealers....	7.50

CAST IRON BORINGS

Birmingham	6.00- 7.00
Boston dist. chem...	†6.00- 6.50
Bos. dist. for mills.	†6.50
Buffalo	6.50- 7.00
Chicago	5.25- 5.75
Cincinnati, dealers..	3.00- 3.50
Cleveland	6.50- 7.00
Detroit	4.50- 5.00
E. Pa., chemical....	11.00-12.00
New York	†4.00- 4.50
St. Louis	4.00- 4.50
Toronto, dealers....	7.50

PIPE AND FLUES

Cincinnati, dealers..	6.50- 7.00
Chicago, net	7.50- 8.00

RAILROAD GRATE BARS

Buffalo	9.00- 9.50
Chicago, net	7.50- 8.00
Cincinnati	6.00- 6.50
Eastern Pa.	12.50-13.00
New York	†8.00- 8.50
St. Louis	8.00- 8.50

FORGE FLASHINGS

Boston district	†7.00
Buffalo	10.50-11.00
Cleveland	10.50-11.00
Detroit	6.00- 6.50
Los Angeles	9.00
Pittsburgh	12.00-12.50

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	14.50-15.00

ARCH BARS, TRANSOMS

St. Louis	13.00-13.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	12.00-12.50
Chicago, elec. fur...	10.50-11.00
Eastern Pa.	12.50-13.00
St. Louis	8.50- 9.00
Toronto	8.00

STEEL CAR AXLES

Birmingham	16.00-17.00
Buffalo	16.00-16.50
Boston district	†14.00
Chicago, net	17.00-17.50
Eastern Pa.	21.50-22.50
St. Louis	17.50-18.00

SHAFTING

Boston district	†14.00
New York	†15.00-15.50
Eastern Pa.	19.00-19.50
St. Louis	13.00-13.50

CAR WHEELS

Birmingham	14.00-15.00
Boston dist., iron...	†10.00
Buffalo, steel	16.00-16.50
Chicago, iron	13.00-13.50
Chicago, rolled steel	14.00-14.50
Cincinnati, iron	14.00-14.50
Eastern Pa., iron...	15.50
Eastern Pa., steel..	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel ...	17.50-18.00
St. Louis, iron	11.50-12.00
St. Louis, steel	14.50-15.00

NO. 1 CAST SCRAP

Birmingham	14.00-14.50
Boston, No. 1 mach.	†11.00
N. Eng. del. No. 2..	12.00
N. Eng. del. textile.	14.00-14.50
Buffalo, cupola ...	13.50-14.00
Buffalo, mach.	15.00-15.50
Chicago, agri. net..	10.50-11.00
Chicago, auto	11.50-12.00
Chicago, railr'd net	10.50-11.00
Chicago, mach. net.	11.50-12.00
Cincin., mach. cup..	10.50-11.00
Cleveland, mach....	17.00-17.50
Eastern Pa., cupola.	15.50-16.00
E. Pa., mixed yard.	13.50-14.00
Los Angeles, net....	13.50-14.00
Pittsburgh cupola..	15.50-16.00
San Francisco, del..	13.50-14.00
Seattle	8.00
St. Louis, No. 1	10.00-10.50
St. L., No. 1, mach.	12.00-12.50
Toronto, No. 1, mach., net	12.50

HEAVY CAST

Boston dist. break..	†9.00- 9.50
N. Eng., del.	11.50-12.00
Buffalo, break	11.00-11.50
Cleveland, break. ..	14.00-15.00
Detroit, break.	10.50-11.00
Detroit, auto net...	11.50-12.00
Eastern Pa.	14.00-14.50
Los Ang., auto, net.	13.00-13.50
New York, break. ..	†10.50-11.00
Pittsburgh, break...	12.50-13.00

MALLEABLE

Birmingham, R. R.	12.50-13.50
New England, del...	16.00
Buffalo	13.50-14.00
Chicago, R. R.....	13.50-14.00
Cincin., agri. del...	10.00-10.50
Cleveland, rail	15.50-16.00
Detroit, auto	10.50-11.00
Eastern Pa., R. R...	15.50-16.00
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	11.00-11.50

RAILS FOR ROLLING

5 feet and over

Birmingham	16.00-17.00
Boston	†12.00
Chicago	15.00-15.50
Eastern Pa.	18.00-18.50
New York	†15.00-15.50
St. Louis	13.50-14.00

LOCOMOTIVE TIRES

Chicago (cut)	14.00-14.50
St. Louis, No. 1	13.75-14.25

LOW PHOS. PUNCHINGS

Buffalo	16.00-16.50
Chicago	13.50-14.00
Eastern Pa.	18.00-19.00
Pitts. (lt. & hvy.)..	17.00-18.00
Seattle	15.00

Iron Ore

Lake Superior Ore

Gross ton, 51½ % Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00-13.00
No. Afr. low phos.	nominal
Swedish low phos...	17.00-18.00
Spanish No. Africa basic, 50 to 60% nom..	12.00
Tungsten, sh. ton. unit, duty paid nom.	22.00-22.50
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f...	$25.50-26.50
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% .. .. non.	45.00
So. African, 50-52% nom.	45.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 82

Pittsburgh—Sheet demand continues dull. Fair tonnage in galvanized sheets has been received, although this seems to be the only division of the sheet market which shows activity. No possibility is seen of early relief from automotive sources as it is believed backlogs of sheet tonnages are higher than most other materials in the hands of automotive producers. Production is holding at the same level, slightly above 30 per cent, and orders are still widely diversified, many for immediate use and obviously for orders now on hand.

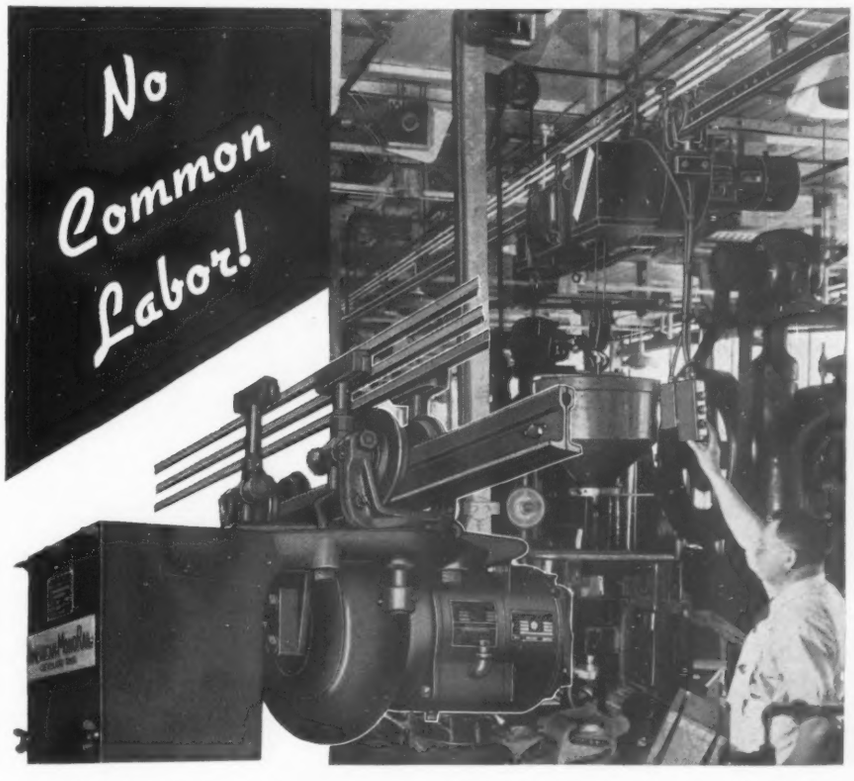
Cleveland—Despite absence of anticipated releases from auto builders, producers report total shipments during March showed a moderate improvement over February. A number of miscellaneous customers were forced to re-enter the market after a long absence to replenish stocks. Buying is hand to mouth, representing only actual requirements and for prompt delivery. Finishing mill operations are substantially unchanged.

Chicago—Sheet producers are resigned to continued poor demand from the automotive industry through first half, anticipating little additional buying for 1938 models. Sheet business elsewhere shows occasional gains, principally from miscellaneous consumers and frequently involving customers who have been out of the market for a number of months. Small lots usually are involved, with prompt shipment generally requested.

Boston—Sheet buying has improved slightly, partly seasonal in the case of galvanized, and users of special finishes in a few instances are releasing more tonnage. Makers of household equipment, air conditioning and scattered miscellaneous consumers account for the mild improvement. Stamping shops are buying sparingly.

New York—A decidedly mixed situation still prevails in sheets, with general volume at present just about being maintained. Principal activity has been on galvanized sheets, which have been moving more freely in the building trades and which are still being specified in relatively fair amount by manufacturers of air conditioning equipment as is also black pickled sheets. Domestic refrigerator specifications have recently dropped off, reflecting apparently the continued shrinkage in consumer purchasing power. It is also believed in some quarters, although not confirmed by mill representatives generally, that jobbers by virtue of their buying recently have stocked up sufficiently to preclude much further expansion in this direction for some time. One large seller believes that the buying wave from jobbers is over until the beginning of next quarter.

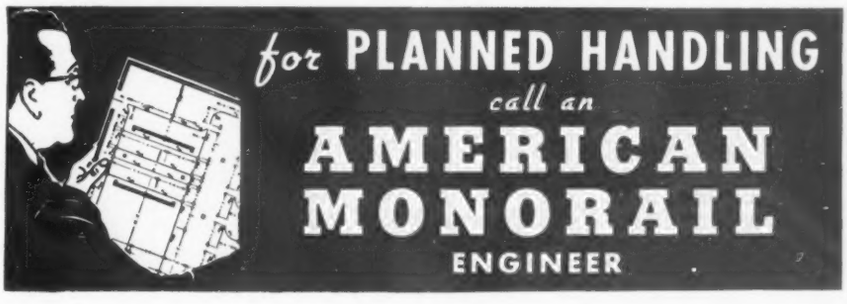
Philadelphia—E. G. Budd Mfg. Co. expects April activity, largely automotive, will be approximately on par with March, as indicated by the fact that it is projecting April output of hydraulic compressed sheet scrap at 2200 tons, about unchanged from March. Sheet inventories of leading consumers still are in the process of liquidation, some shearing material to proper size rather than make new purchases. However, stocks have definitely been worked to fairly normal levels in a number of directions. One large maker of automotive replacement parts, as well as new work, will be back in the market for both hot and cold-rolled sheets within the next two weeks. Roberts & Manders Stove Co. again is taking in material following a prolonged strike but requirements of other stove makers are light. The radio trade has large stocks of finished sets on hand and is accounting for little tonnage. One of the brightest spots is provid-



. . . and no lost machine time. Slugs of semi-precious metal are delivered from a central control point by this automatic carrier. The skilled operator merely signals for metal and, when it arrives, unloads the carrier and returns it by push-button switch. Wise management gets full benefit from his skilled wage.

This is but one of the many systems designed by American MonoRail engineers for eliminating needless handling costs. Both manual and power operated carriers show labor saving returns.

A copy of 24 page book describing the MonoTractor drive is available. Write to the American Mono-Rail Co., 13102 Athens Avenue, Cleveland, Ohio.



ed by galvanized sheets, which are moving well through jobbers to the sheet metal trade.

Buffalo—The sheet market continues in the doldrums with no important buying noted. With orders from automobile and accessory manufacturers lagging anticipated buying from forging and kindred concerns has also failed to develop. Mills are guarding against accumulating large inventories.

Cincinnati—Sheet buying last week failed to sustain the better pace of the preceding week, greatest disappointment being hesitancy in automotive demand. There is some fill-in buying for auto bodies. Requirements for household equipment are steady. Galvanized holds market leadership. Mills are operating about 30 per cent of capacity although weekly steelmaking schedules vary widely in continuance of staggered production.

St. Louis—Purchasing of sheets is fairly well maintained and shipments this month, according to present indications, will be the largest since last fall. Seasonal influences are affecting the movement of galvanized sheets, particularly to rural areas, where building of small dwellings is in considerable volume. Manufacturers of refrigeration are still accounting for sizable tonnages.

Birmingham, Ala. — Sheets are in approximately the same demand as for the past few weeks with most business from widely scattered sources and in comparatively small lots.

Strip

Strip Prices, Page 83

Pittsburgh—Production of hot and cold-rolled strip during March is reported slightly improved over February, although the gain is negligible, and the outlook is anything but prosperous. Continued lack of demand from automotive sources is anticipated as motor companies have announced greatly reduced schedules for the remainder of the 1938 model year. Production is slightly over 20 per cent of capacity in both hot and cold-rolled divisions.

Cleveland—Specifications for hot and cold-rolled strip have shown little improvement recently, although sellers estimate total tonnage shipped during March improved somewhat over February. Inventories among most consumers are low and this should soon be reflected in increased specifications. Releases from auto builders were light throughout March.

Chicago—While strip demand is retarded by the lag in automotive buying, heavier sales to miscellaneous consumers provided a moderate upturn during March. Little improvement in strip needs of motor car interests is seen for April but requirements of other users are expected to be maintained at or above recent levels.

Boston—Cold strip orders continue in small lots for prompt delivery as consumers buy for immediate needs only, filling gaps in stocks. A few producers report a shade better demand from household equipment makers, but little improvement in automobile accessory requirements.

New York — Piecing-out buying continues to dominate demand for cold-rolled strip, orders being for prompt shipment, with no forward buying. A few sellers are taking small orders for automobile parts, but banks of finished stocks tend to restrict strip purchasing regardless of steel inventories, which have worked low in some shops. Hot strip demand is spotty for fill-in needs.

Philadelphia—Narrow strip business shows some expansion but in aggregate continues disappointing to sellers. One of the large stamping plants is slightly more active and has issued a few releases. Prices are fairly steady.

Birmingham, Ala. — Little strip is being produced currently. Not a great deal of business is anticipated until renewal of cotton tie orders later in the season.

Plates

Plate Prices, Page 82

Philadelphia — Stacey Mfg. Co., Cincinnati, is reported to have taken a 1400-ton gasholder for the Connecticut Light & Power Co. at Waterbury, Conn., through United Engineers & Constructors Inc., Philadelphia. This has been one of the few outstanding tank jobs before the trade in some time. Pusey & Jones, it is understood, has allocated the plate tonnage required for an army dredge booked several months ago. Plates for Standard Oil tankers still are pending since designs have not been finally approved. One or two shipbuilders in line for this business, however, have placed a little tonnage. According to trade opinion, Sun, Newport News, Tampa and Federal will each get three of the cargo boats for the Maritime commission. Each requires 2900 tons, of which about 70 per cent will be plates. Platemakers are looking forward to considerable navy business but point out that most of this will not reach their order books for a year or so. Miscellaneous plate buying seems to be holding well although some mills report March tonnage did not quite match the total for February.

Pittsburgh — Plate production has increased slightly over the past two weeks and the last half of March will probably exceed the first half. Construction projects are appearing more frequently and it is entirely possible that demand will show up better in the later spring months. Important projects are pending, which will provide considerable tonnage when released.

Cleveland — Plate requirements are limited to small miscellaneous needs, with little change during March. Absence of the railroad buying and the light demand for tank, boiler and other miscellaneous needs contribute to the present dull market. Prices are unchanged.

Chicago — More activity in tank work and a slight upturn in demand from structural fabricators constitute the principal favorable development in the plate market. Railroad buying remains dormant and is expected to continue so for at least 30 days. Fairly active demand from the oil industry for tank work and improvements to refineries is looked for during coming months.

Boston — Plate fabricating shops are buying sparingly and miscellaneous demand is limited to small shipments with few full car orders. Ship tonnage releases are steady, but railroads are not buying, although requirements of car-building shops at Worcester are substantial. Most tonnage for the New Haven railroad cars has been placed. A bridge at Wickford Junction, R. I., takes 66 tons of wrought iron, largely plates. Bids close April 7 on a replacement fuel oil tank, army base, Boston.

New York—The plate outlook is mixed. Little is in sight from railroads, normally a major outlet, but there is promise of somewhat more shipwork and miscellaneous requirements from oil companies are expected to at least be maintained. So far this year these latter requirements have been a mainstay in such business as has been booked in this district. The improved prospects for shipwork over the next few weeks lie in part in tonnage for ships on which construction contracts have already been let and in the possibility that further ship contracts will be awarded shortly, notably the cargo boats still to be placed by the United States maritime commission. Incidentally, the two coast guard cutters, on which the Marine Utilities Inc., Whitestone, N. Y., was low, have been awarded to the Dafoe Boat & Motor Works, Bay City, Mich., the bid of the local company having been rejected on a technicality. A substantial oil company fabrication con-

tract is reliably understood to have been placed here within the past week.

Birmingham, Ala. — Bookings of plates are on a moderate basis, at approximately the same rate as since the first of the year, although some new business is believed definitely in sight.

San Francisco — Little new plate business has developed and only two projects in excess of 100 tons were booked. Western Pipe & Steel Co. secured 242 tons for a 56-inch welded steel pipe line for Pacific Gas & Electric Co., San Francisco. Awards for the week aggregated only 457 tons, bringing the total to date to 12,218 tons, compared with 20,967 tons for the corresponding period in 1938.

Seattle—Seasonal boiler and tank jobs, mostly repairs, are giving local shops some activity but large projects are lacking. Immediate prospects are unpromising. Alaska railroad purchasing agent, Seattle, received bids March 30 for furnishing a steel smokestack, blowoff and receiving tanks and other items. Collins Concrete & Steel Pipe Co., Portland, Oreg., is low for furnishing the Alaska road commission 10,868 feet of corrugated, galvanized culverts.

Plate Contracts Placed

3000 tons, tanks, Humble Oil & Refining Co., Baytown, Tex., to Chicago Bridge & Iron Co., Chicago; capacity of tanks: three 116,000-barrel; three 80,000-barrel and two 20,600-barrel.

1400 tons, gas holder, Connecticut Light & Power Co., Waterbury, Conn., through United Engineers & Constructors Inc., Philadelphia, to Stacey Mfg. Co., Cincinnati.

270 tons, two 110-foot coast guard cutters, Nos. 72 and 73, to Dafoe Boat & Motor Works, Bay City, Mich.; bids March 22, U. S. coast guard, Washington, at $309,444 each; low bid by Marine Utilities Inc., Whitestone, N. Y., disallowed.

242 tons, for 56-inch welded steel pipe for Pacific Gas & Electric Co., San Francisco, to Western Pipe & Steel Co., San Francisco.

100 tons, hatch covers, Metropolitan water district, Los Angeles, to unnamed interest.

Unstated tonnage, wrought iron hull for derrick boat, U. S. engineer, Mobile, Ala., to Ingalls Iron Works, Mobile, $21,581; bids Feb. 10.

Plate Contracts Pending

Unstated tonnage, 100,000-gallon elevated steel water tank, veterans' hospital, Murfreesboro, Tenn.; bids May 17, construction division, veterans administration, Washington.

Navy Buys 11,500 Tons Native Ferromanganese

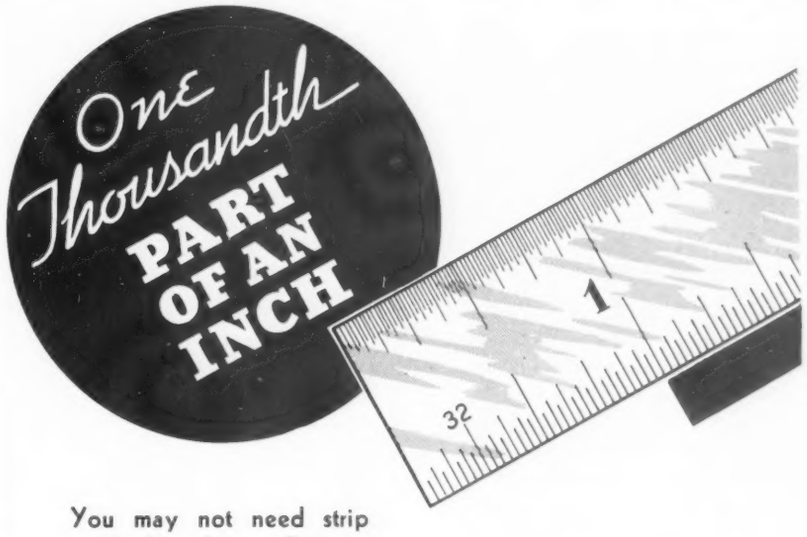
Washington — The navy department has announced the following awards for ferromanganese, bids for which were opened March 18: Colorado Fuel & Iron Corp., Denver, 5,500 tons at $105 per ton f.o.b. Minnequa, Colo. (freight rate to Philadelphia $13.75 per ton); E. J. Lavino & Co., Philadelphia, 6000 tons delivered at Philadelphia, $110.50 per ton. It is understood that all ore used in the manufacture of this ferromanganese is to be 100 per cent domestic origin.

Bars

Bar Prices, Page 82

Pittsburgh — Production of steel bars during March continued disappointing, due to lack of demand by railroads and automotive producers. Although the total is slightly better than for February, the increase reached a standstill in the last half of the month.

Cleveland—Specifications for commercial carbon steel bars improved little during March, due largely to small releases from automotive suppliers. Requirements from farm and road equipment concerns have offered most encouragement, but until railroads and automotive interest substantially increases requirements no real improvement



You may not need strip steel that thin. But we make it for firms who do—and they require it unusually accurate to gauge. These manufacturers know from experience that "C.M.P. Accuracy" in any thickness means uniformly close gauge tolerances at commercial tolerance prices.

These same precision qualities are available to you in the gauges you require—at no extra cost. Leave the matter of gauge tolerance to us by simply specifying "C.M.P. Accuracy."

The Cold Metal Process Co.
YOUNGSTOWN, OHIO

Cold Rolled
PRECISION
STRIP STEEL

Behind the Scenes with STEEL

Humid Humor

■ Friday was a day to tread carefully, to remain passive and unexcited when informed that the mayor, or maybe the governor, was downstairs and wanted to see us, a day to refuse invitations to free lunches and banquets. But in spite of it all, we couldn't help getting excited when the interoffice mail brought us an impressive envelope, such as is used only by the auditing department for dishing out dough. A little extra cigarette money, perhaps? Ah, yes, there was a check inside—on which was written: "April Fool, Auditing Dept." Some joke, hey Boss?

Steel Gets Treatment

■ "Lonely Hearts Turn Back Steel" was the most puzzling newspaper headline of the month (when viewed over the shoulder of the man in the seat ahead on the interurban this ayem). During the brief journey (8 miles in 40 minutes) we brooded over its possibilities. Was this another case of love surmounting all obstacles? Or had some Romeo, stabbed in a duel, refused to die? The letdown came when we finally got hold of the paper (the owner got off at 25th street). The intriguing headline was followed by an account of a basketball game between the Port of Lonely Hearts and the Midland Steel Co. teams.

Cutting Their Teeth

■ The recent trend toward packaging small goods in metal containers instead of cardboard or other nonmetallic materials is a neat contrast to the Nazi idea of packaging, whereby metals have become so precious that even toothpaste tubes have to be made of something other than metal. And housewives can be practically drawn and quartered for throwing away tin cans. But we wonder how Der Fooler has dealt with that venerable problem of what to do with old razor blades. Maybe they give 'em to the children to play with.

High-Speed Steak

■ If you were one of those kids that was (or still is) addicted to miniature railroading, you'll be interested in that ad of New Jersey Zinc Co. on page 37. Just for fun turn to the SKF ad on page 54 and compare the real-life locomotive with the miniature pictured in the NJ Zinc ad. Incidentally, members of STEEL's engineering staff all admit they were violent toy train fiends in their day. In fact, one still boasts of having his own railroad at home, but refuses pleas that he bring it to the office for the others to play with. Says he's experimenting to find new uses for steel. Incidentally again, we make note that the German government railroads have a crack passenger train naively named "The Flying Hamburger." Whee! —with mustard and onions, Adolph?

Add Ads

■ "How to Take the Beard off a Bowling Ball" as mentioned in Carborundum's ad on page 67 is an orb-grabber you can hardly resist. At last we know what's responsible for all the low scores made by the editorial department's Tuesday Noon Keglers.

Scrap Prices Down

■ *Daily Metal Trade* this week divulges the significant information that many small scrap metal gatherers (junkmen to us) have given up their once-lucrative routes and joined WPA. Now we know what happened to that impudent rascal who stopped by our house one day, enviously eyed our jazz-age vintage junker, and offered us 37c for the motor. Hmm, maybe he wasn't such a bad fellow after all. Wonder when he'll be back.

—SHRDLU

can be expected. Prices are unchanged.

Steel Improvement & Forge Co., Cleveland, is low on 366 turret rollers, rough machined forgings, for delivery at the Brooklyn and Philadelphia navy yards, at $73,492.80, bids March 25, schedule 3026, navy department, Washington.

Chicago — Miscellaneous consumers continue to furnish sufficient bar business to maintain recent gains in sales. Prospects for heavier buying by the automotive industry are fading and little improvement in that direction is seen. Needs of farm equipment manufacturers are well sustained though operations of tractor builders are restricted by quieter demand for industrial types than a year ago.

Boston—Alloy bar requirements for chain manufacture are heavier, most demand being for navy and marine use. Several hundred tons of large forgings for shipbuilding in this district have been bid, Pennsylvania shops being low. On recent bids for corrosion-resisting bars for Newport, R. I., torpedo station all bids were identical. Industrial demand for alloy and cold-finished stock is in small lots. Jobbers are buying fill-in lots of soft steel bars only. Machinery needs have slackened slightly.

New York—Bar demand has flattened, following a slight increase in March. Jobbers appear fairly well stocked. Sellers of cold-drawn bars, having experienced some lift in tonnage for special equipment, such as paper-making machinery, see little further gain in the shipment of cold finished bars this month.

Baldt Anchor, Chain & Forge Co., Chester, Pa., has booked the contract for chain required for three Standard Oil Co. tankers under construction by the Federal Shipbuilding & Drydock Co., Kearny, N. J., at approximately $31,000. This material is forged from round 3.50 per cent nickel-steel alloy bars, the links being 2⅜-inch diameter.

Philadelphia—March business in merchant bars is estimated to have topped the February total by approximately 10 to 15 per cent. While incoming business is far from satisfactory, sellers are encouraged by its widely diversified character. Consumer inventories said to be fairly close to normal except in the case of certain warehouses which are over-stocked on some specifications.

Birmingham, Ala. — Slight improvement is reported in demand for bars. Steel interests believe second quarter will develop some worthwhile bookings.

Pipe

Pipe Prices, Page 83

Pittsburgh — Activity is still low in pipe and tubular goods, with probably the most active division remaining oil country tubing. Some smaller items have become a little more active lately and spring manufacturing programs are expected to result in a gradually increasing demand. Figures at the end of the first quarter show a decrease from the last quarter of 1937, although figures for March are improved over February.

Cleveland — Requirements for standard steel pipe from private sources have shown little change within the last few weeks. Jobbers are making no effort to bolster stocks, buying only for fill-in purposes. Outlook for the cast iron pipe market is more encouraging, reflecting the possibility of increased WPA activity. Pending WPA approval, Huron, O., will take bids on 20,000 feet and Cuyahoga Falls, O., 12,000 feet, for extensions to water distribution systems. Prices are firm.

Chicago — Introduction of higher freight rates has advanced delivered cast iron pipe price here 60 cents a net ton. New market is $57.80 to $58.80 for 4-inch pipe and $54.80 to $55.80 for 6 to 24-inch material. Market continues slow, and while some seasonal gains have occurred in demand for small lots, absence of inquiries involving larger tonnages points to only moderate betterment in shipments in the near future.

New York — Ranging from $54.80 to $56.80 delivered, the bulk of 1600 tons, 8 to 20-inch cement-lined cast pipe, New York city yard stocks, went at $55.40, delivered, to the Burlington, N. J., foundry. Prices on pipe held relatively better than those submitted on 185 tons of special castings. Inquiry for cast pipe, usually seasonally active at this time, is notably slow with 400 tons, including fittings, for Thiells, N. Y., to be bought by a contractor.

Apart from a small seasonal rise due to building requirements, merchant pipe demand continues sluggish and is accompanied by as sharp a competition among resellers as has been witnessed any time this year.

Birmingham, Ala. — Pipe buying shows no appreciable pickup, although production is comparatively satisfactory as a result of widely scattered but relatively small orders. Production is at about 40 per cent.

San Francisco—Cast pipe awards were all less than 80 tons and pending business does not exceed 1600 tons. To date this year 8595 tons have been placed, compared with 11,523 tons for the same period a year ago.

Seattle—No important projects are up for figures but additional jobs are expected to develop soon. Bremerton, Wash. is considering a $30,000 pipe replacement improvement. Spokane will open bids April 7 for hydrants, valves, etc. WPA allotments for Western Washington districts total $70,000.

Steel Pipe Placed

200 tons, 12-inch, pile foundations, world's fair, New York, to J. K. Larkin & Co., New York, through state procurement officer, treasury department, New York.

Cast Pipe Pending

100 tons, 10-inch, enamel-lined, trunk sewer project, Dobbs Ferry, N. Y.; bids April 8.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 83

Bolt, nut and rivet specifications during March showed little change

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•

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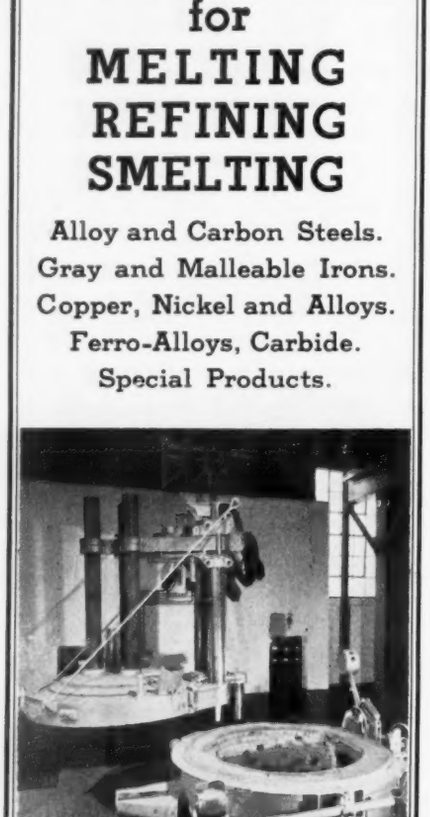

Illustration shows a 3 tons per hour top charge type LECTROMELT furnace with the roof raised and rotated so that the furnace can be quickly and conveniently charged with a crane handled drop bottom bucket.

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from February. Application of higher freight rates has been without effect on railroad demand, and bolt, nut and rivet requirements at car shops continue slow. Consumption by farm equipment manufacturers is well maintained and occasional gains in shipments from jobbers' stocks are reflected in orders from distributors.

Wire

Wire Prices, Page 83

Pittsburgh — Merchant wire products, especially woven wire fence, have reached a stage of fairly satisfactory activity. In fact, some plants are reported to be running behind on orders for fencing. The farm demand has come in even greater volume than was anticipated. Quantity discounts on merchant wire items have been reduced by extending the classification which previously reached 59,999 pounds up to 79,999 pounds and eliminating the $2 discount which previously was in force in that higher division. Two classifications of less-carload lots have been eliminated and the less-carload extras now apply on shipments under 1000 pounds and between 1000 pounds and a minimum carload only.

Cleveland—Demand for merchant wire products increased markedly the past month, reflecting the seasonal impetus from rural districts. Almost in direct contrast with this, specifications for manufacturing wire remained substantially unchanged through March.

Chicago—March showed a fairly substantial gain in wire sales, a large share of which was contributed by better demand for merchant products. Prospects for sales of fencing and barbed wire in rural districts are relatively more favorable than the outlook for manufacturers' wire business though some improvement in consumption in the latter has appeared the last few weeks. Automotive needs still drag.

Boston—Demand for manufacturers' wire and specialties is a shade better in spots. Buying of merchant products has improved, mostly by jobbers, but such tonnage is of limited benefit to mills in this district. Finishing operations are still around 30 to 35 per cent of capacity. Lack of buying by most manufacturing industries requiring specialties continues to depress mill schedules.

Birmingham, Ala.—Wire demand is showing some improvement as based on spot business. Inventories of wire and wire products are low and mill stocks generally need building up.

Rails, Cars

Track Material Prices, Page 83

Inquiry for possibly 40,000 tons of rails is expected shortly from the New York Central. Present trade estimates, it may be noted, place this tonnage larger than a month or so ago when it was generally believed it would amount to 20,000 to 30,000 tons. Possibility that the New York Central requirements will be heavier than originally indicated tends to compensate sellers for the delay which is accompanying issuance of this list. Meanwhile the Delaware, Lackawanna & Western has just closed on 1200 tons of rails and the New York, New Haven & Hartford on 7500 tons, both orders going to Bethlehem Steel Co., Bethlehem, Pa.

Miscellaneous steel for 500 box cars for the Bangor & Aroostook has been placed by the Magor Car Corp., Passaic, N. J., with a Pittsburgh mill, with roofs going to the Hutchins Car Roofing Co. and the ends to the Murphy plant at Chicago, through the Standard Railway Equipment Co., New York. Wheels, as noted in a recent issue, have been placed with the Ramapo Foundry & Machine Co., Ramapo, N. Y.

Interboro Rapid Transit Co., New York, has awarded bodies and trucks for 50 subway cars to St. Louis Car Co. Railroad equipment demand otherwise is negligible.

Car Orders Placed

Interboro Rapid Transit Co., New York, bodies and trucks for 50 subway cars, to St. Louis Car Co., St. Louis.

Rail Orders Placed

Delaware, Lackawanna & Western, 1200 tons, to Bethlehem Steel Co., Bethlehem, Pa.

New York, New Haven & Hartford, 7500 tons, rails and accessories, to Bethlehem Steel Co., Bethlehem, Pa.

Shapes

Structural Shape Prices, Page 82

New York—Estimates are in on 8850 tons for tunnel, approach and bridge needs, Harris Structural Steel Co., New York, being low on 3600 tons, roadway rebuilding, Manhattan bridge, New York. Awards are slightly heavier, aggregating 4200 tons, including 1350 tons, world's fair building, and a bridge, 2500 tons, in connection with the west side elevated highway project, New York. Bids close April 12 on the superstructure, U. S. government building, world's fair, taking a substantial

tonnage. New inquiry also includes 750 tons for New York city schools.

Fabricated structural steel orders booked during January and February approximated 50 per cent of the business done during the same months last year, according to the American Institute of Steel Construction. February orders amounted to 49,780 tons or 21.3 per cent of normal (the yearly average for the period 1928-31 inclusive.) For the first two months this year bookings averaged 25.9 per cent of normal, whereas during the same period last year orders averaged 54.7 per cent of normal. Totals for the first two months were: Bookings 121,399 tons and shipments 164,169 tons.

Pittsburgh — Pending contracts have shown a gratifying increase, although most projects are fairly small. A fair tonnage of shapes is expected to be rolled during April. Tonnage for March was somewhat better than February.

Cleveland — Structural inquiries and awards failed to show the expected improvement during March. Few private projects are pending and these small miscellaneous tonnages. However, considerable tonnage is involved in the Main street bridge, Cleveland, in addition to a number of state grade crossings which should materialize within the next few weeks. Mill prices are unchanged, but weakness is still noted in fabricated material.

Chicago—While structural inquiries are heavier, bids are being requested in a number of instances for projects which are regarded as having only a slight chance of materializing soon, pending improved business conditions. Active jobs in most instances are small while awards also lack improvement.

Boston—Structural contracts have declined with district shop backlogs lower, an exception being the Holyoke, Mass., fabricator. Bids close April 18 on a 600-ton bridge, North Kingstown, R. I. A special commission has reported in favor of purchase of the Atlantic avenue elevated railroad structure at a cost of $4,400,000 and converting the same into a four-lane elevated highway connecting the North and South stations, Boston.

Philadelphia — Fabricators figure that several buildings for Penn State college, State College, Pa. will take only 2500 tons rather than the 3650 tons estimated by engineers. Plans are due shortly on the last remaining important job on the Pennsylvania state institutional program. This is the White Hill school for boys at Harrisburg, due April 22 and costing $2,500,000. Some private work is coming out but most fabricators see little business ahead. Current shop operations are at 40 to 50 per cent.

Buffalo—Rural schools, numbering around twenty, to be built in the western half of New York state are a bolstering element in the shape market. With several jobs awarded recently, three more at Scio, Cuba and Rushville will be up for bidding shortly. The 650-ton state Cancer hospital project for Buffalo, after four delays, definitely will be bid on April 14th.

San Francisco — Columbia Steel Co., San Francisco was awarded the sub-contract for 2500 tons of sheet

Shape Awards Compared

	Tons
Week ended April 2	17,510
Week ended March 26	13,052
Week ended March 19	20,632
This week, 1937	20,398
Weekly average, year, 1937	16,060
Weekly average, 1938	14,466
Weekly average, February	10,059
Total to date, 1937	381,832
Total to date, 1938	202,529

Includes awards of 100 tons or more.

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piling for improvement of the Alameda, Calif., waterfront for the navy department, through the San Francisco Bridge Co., San Francisco.

Seattle—Lacking confirmation here is the report that the American Bridge Co., Portland, has been awarded 1075 tons of shapes and machinery and 500 tons H-piling for the Washington-Idaho joint bridge over the Snake river, Puget Construction Co., Seattle, general contractor.

Shape Contracts Placed

2500 tons, sheet piling, improvement Alameda, Calif., waterfront for navy department, to Columbia Steel Co., San Francisco.

2500 tons, bridge, West and Marginal streets across Canal street, west side elevated project, New York, to Harris Structural Steel Co., New York, James Stewart & Co., New York, general contractor; bids March 23, borough president, Manhattan.

2420 tons, Trinity river bridge, Fort Worth, Texas; 1645 tons, Virginia Bridge Co., Roanoke, Va., 775 tons, Peden Steel Co., Raleigh, N. C.

1575 tons, shapes, piling and machinery, Washington-Idaho Snake river bridge, to American Bridge Co., Portland.

1350 tons, amphitheater, New York state building, world's fair, New York, to Lehigh Structural Steel Co., Allentown, Pa., Psaty & Fuhrman Inc., New York, general contractor.

950 tons, bridge, Lewiston, Idaho, to Virginia Bridge Co., Roanoke, Va.

800 tons, bridge, Ashland-Bridgewater, N. H., to American Bridge Co., Pittsburgh; Lane Construction Co., Meriden, Conn., general contractor; design "A," which includes 11,810 feet of armored concrete bridge floor and 55 tons reinforcing steel; bids March 9, Concord, N. H.

500 tons, shapes and bars, additional building, Charity hospital, Pineville, La.: to Jones & Laughlin Steel Corp., Pittsburgh; and Connors Steel Co., Birmingham; Caldwell Bros. & Hart, New Orleans, general contractor.

465 tons, bridge contract 98, Knox county, Texas, to Virginia Bridge Co., Roanoke, Va.

390 tons, building, state teachers college, Kutztown, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.

325 tons, bridge FAP-648D, Collin county, Texas, to Peden Steel Co., Raleigh, N. C.

305 tons, bridge FAP-36-11, Caldwell county, Texas, to Alamo Iron Works, San Antonio, Tex.

300 tons, substructure, amphitheater buildings, World's Fair, New York, to Ingalls Iron Works, Birmingham, Ala.; through Corbetta Construction Co., New York.

240 tons, bridge contract 137, Archer county, Texas, to North Texas Iron & Steel So., Fort Worth, Tex.

205 tons, building, Lincoln savings bank, Brooklyn, N. Y., to Harris Structural Steel Co., New York; through Charles E. Kreig Co., New York.

200 tons, barracks, administration and class room building, Citadel military school, Charleston, S. C., Carolina Steel & Iron Co., Greensboro, N. C.; Southeastern Construction Co., Charlotte, N. C., general contractor.

200 tons, bridge, Goose and Stoney creeks, Bedford count, Virginia, to Virginia Bridge Co., Roanoke, Va.; R. W. Moore, Staunton, Va., general contractor.

190 tons, market building, New York, to Belmont Iron Works, Eddystone, Pa., through procurement division, treasury department, New York.

180 tons, Kress store, San Pedro, Calif., to Bethlehem Steel Co., Los Angeles.

175 tons, bridge FAS 397, Rio Grande county, Colorado, to Midwest Steel & Iron Co., Denver.

165 tons, warehouse, Rocco Van & Storage Co., Queens, N. Y., to Long Island Iron Works, Queens, N. Y.

160 tons, home economics building, Springfield, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

150 tons, coal trestle, Kelly Colliery Co., Morgantown, W. Va., to Riverside Steel Co., Wheeling, W. Va.

145 tons, bridge, section 11B, Brooklyn, Schuyler county, Illinois, to Fort Pitt Bridge Works, Pittsburgh.

140 tons, bridge over Big Springs and Polecat creeks, Guntersville, Ala., for Tennessee Valley authority, to Bethlehem Steel Corp., Bethlehem, Pa.

125 tons, Rudell Station bridge, Los Angeles county, California, for state, to Ingalls Iron Works, Birmingham, Ala.

125 tons, overhead crossing, Huerfano county, Colorado, to Des Moines Steel Co., Des Moines, Iowa.

110 tons, superstructure, coagulation basin, Elmira, N. Y., to Seneca Engineering Co., Montour Falls, N. Y.

110 tons, sub-station E, Memphis, Tenn., to Tulsa Boiler & Machinery Co., Tulsa, Okla.

110 tons, International Harvester Co., warehouse, Seattle, to Isaacson Iron Works, Seattle.

100 tons, shapes and bars, central high school, Waterville, N. Y., to Utica Steam Engine & Boiler Works, Utica, N. Y., and Joseph T. Ryerson & Son Inc., Chicago; C. J. Burgess & Son, Schenectady, N. Y., general contractor.

100 tons, addition to General hospital, Bakersfield, Calif., to Consolidated Steel Corp., Los Angeles.

100 tons, theater, North Adams, Mass., to Berlin Construction Co., Berlin, Conn.

100 tons, bottling plant, Coca Cola Co., Paducah, Ky., to Pidgeon-Thomas Iron Co., Memphis, Tenn.

Shape Contracts Pending

9510 tons, Main avenue bridge, Cleveland, bids due April 29 to Cuyahoga county commissioners; bids also for 9 piers on the same date, involving 250 tons of reinforcing bars; project also includes two river piers involving 186 tons of reinforcing, on which bids are due April 12.

4500 tons, Queens land section, East river tunnel, New York; Charles F. Vachris, Inc., Brooklyn, N. Y., low, bids March 30.

3600 tons, rebuilding roadway, Manhattan bridge, New York, Harris Structural Steel Co., New York, low, bids in.

2000 tons, estimated, superstructure, U. S. government building, world's fair, New York; bids April 12.

2000 tons, buildings, Springfield, Mass., for Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

1325 tons, state bridges, Texas.

900 tons, Will Rogers stadium, Colorado Springs, Colo., for Broadmoor hotel.

800 tons, annex, state capitol building, Denver.

750 tons, schools, addition No. 95, Brooklyn, and new school No. 15, Queens, N. Y.; bids April 5, steel work direct, board of education, New York.

750 tons, approach, North Bergen to Bergenline avenue, Union City, N. J., Lincoln tunnel contract MHT-72, Port of New York authority, James Mitchell & Co., Jersey City, low, bids March 29. Contract also requires 29,500 feet reinforcing trusses and 100 tons of miscellaneous steel, castings, anchors, pipe etc.

750 tons, high school, Wauwatosa, Wis.

700 tons, extension to annealing building, for American Rolling Mill Co., Middletown, O.

700 tons, bridge No. 36.6, Pacific, Mo., for Frisco Lines.

617 tons, three-unit through girder steel superstructure, Wickford Junction railroad bridge, North Kingstown, R. I.; bids April 18, board of contracts, standards and purchases, Providence, R. I; tonnage includes 159 tons for temporary track supports and 66 tons of wrought iron in permanent structure.

500 tons, estimated, Security prison, Mont Alto, Pa., bids April 14.

450 tons, bridge, state highway department, Blacksburg, Va., bids in.

300 tons, central school, Romulus, N. Y., Saucke Bros., Rochester, N. Y.; low bidder.

300 tons, Manhasset housing project, Livingston, Ill.

280 tons, state highway bridge, Onage, S. Dak.

265 tons, state highway underpass, Fargo, N. Dak.

260 tons, bridge, St. Onge, S. Dak.

220 tons, state bridge 1618, Knightstown, Ind.

200 tons, school, Trenton, N. J., bids April 6.

175 tons, repairs to bridge No. 48.50, Devon, Conn., for New York, New Haven & Hartford railroad.

165 tons, school, Trenton, N. J.; bids April 4.

150 tons, gymnasium building, for Harvard university, Cambridge, Mass.

150 tons, state bridge 1619-B, Buckskin, Ind.

145 tons, shapes and bars, post office, Glasgow, Mont.; Busboom & Pauh, Salina, Kansas, low, bids March 25.

145 tons, state bridge over Marrowbone creek, Glasgow, Ky.

135 tons, state bridge FAGM-594, Walnut, Iowa.

130 tons, state highway bridge, Vermillion, S. Dak.

130 tons, state bridge 1620, Maxville, Ind.

115 tons, administration building, municipal airport, Buffalo; George W. Walker Inc., Buffalo, low $153,500; bids March 24.

112 tons, bridge, Somers Point, N. J., Delta Construction Co., Hopewell, N. J. low on general contract.

110 tons, warehouse, S. M. Flickinger Co, Elmira, N Y., Streeter, Elmira, low.

110 tons, dormitory, Simmons college, Boston.

100 tons, shapes and bars, bridge, Union county, New Jersey; Gray Construction Co., Morristown, N. J., low.

100 tons, miscellaneous shapes, electrification work, Pennsylvania railroad, Philadelphia.

100 tons, shapes and bars, addition, post office, Northampton, Mass.; Tremaglio Bros., Waterbury, Conn., low, bids March 24.

Tin Plate

Tin Plate Prices, Page 82

Pittsburgh—Tin plate operations continue the brightest spot in the steel production picture. Mills are running at the same rate as last week, somewhat over 60 per cent, and demand for spring and early summer packs is estimated at least normal, if not slightly better. It is reported that new uses for cans, including ginger ale and grape juice, are meeting with popular approval in the sections which are now being tested.

New York—While tin plate buying here is spotty, large stocks car-

ried over from last year are gradually being fabricated, with a result that sellers anticipate a gain in specifications, especially over the end of this month. Salmon pack requirements are now rather well accounted for, but the pea pack is coming up and certain other seasonal packs which will lead to substantial canmaking operations in May and for which tin plate should be released in increasing volume as April draws to a close.

Moreover, labor trouble among the smaller canmakers in this district is less menacing. While almost a score of these smaller manufacturers have been threatened, actual strikes have developed at not more than three or four plants, as noted early in March.

Reinforcing

Reinforcing Bar Prices, Page 83

New York—Including 500 tons of New Jersey hospital and bridge projects, contracts are light. Bids are in on 1300 tons, tunnel approach requirements, but new inquiry for deformed steel bars comes out slowly. A sharp increase in highway mesh needs has developed, 1600 tons pending for New York state, bids being in on most of the tonnage. Billet steel bars starting this week will be 2.82c, cars New York, and 2.87c, delivered job by truck, metropolitan area.

Cleveland—Requirements for reinforcing steel from private sources were low throughout March. Except for a few school projects and the Main street bridge, Cleveland, there has been little to interest fabricators here. Mills continue on reduced schedules with little improvement expected soon. Mill prices are firm, although fabricated material continues to show weakness.

Pittsburgh—Following a period of fairly satisfactory activity, new reinforcing tonnage has dropped off, although releases on previous contracts are coming through in sufficient volume to keep mills running at a better rate than in previous weeks. Ordinarily, this is the beginning of the peak season, and this period of inactivity is regarded as temporary since action is expected at an early date on a good many contemplated projects. Work has begun on a number of projects which were scheduled for this spring.

Chicago — While activity in the concrete bar market is made up principally of small orders and inquiries, there is a fair volume of such work and bookings recently have been heavier than earlier this quarter. State highway work is accounting for moderate tonnages.

Boston — New highway contracts closing this week for Connecticut, call for 265 tons of reinforcing steel, mostly mesh of which 165 tons is for a road, Avon-Simbsury, Conn. While this represents a slight gain in small lot inquiry and buying, the aggregate volume is down.

Philadelphia — Bar requirements for Mont Alta, Pa. prison job are tentatively estimated at 1000 tons. This is the most important project pending other than the 2500-ton government job at Kingston, Pa., previously noted. Fabricators are receiving more inquiries from contractors for small lots required for alteration and addition jobs, including some apartment work.

San Francisco — New inquiries from private interests continues dull. Included among the larger lots recently placed was 500 tons for the Magnin department store, Los Angeles. Awards totaled 1739 tons and brought the year's aggregate to 24,459 tons, compared with 20,263 tons last year.

Seattle — Although the situation holds little promise prices remain firm. Mill operations are spasmodic with sizable tonnages lacking. As far as can be learned 692 tons for the Washington-Idaho bridge have not been sublet.

Concrete Bars Compared

	Tons
Week ended April 2	3,173
Week ended March 26	1,413
Week ended March 19	7,949
This week, 1937	3,570
Weekly average, year, 1937	6,266
Weekly average, 1938	4,964
Weekly average, February	5,208
Total to date, 1937	55,291
Total to date, 1938	69,498

Includes awards of 100 tons or more.

Reinforcing Steel Awards

500 tons, department store, I. Magnin's, Los Angeles, to unnamed interest.

289 tons, paint and oil storage warehouse, Mare Island, Calif., to Herrick Iron Works, Oakland, Calif.

268 tons, bridge No.360-1, Mercer avenue, Princeton, N. J., to Truscon Steel Co., Youngstown, O.

260 tons, arch bridge, Carnegie lake, Princeton, N. J., to Truscon Steel Co., Youngstown, O.; N. A. K. Bugbee & Co., Trenton, general contractor.

250 tons, highway project, Colorado county, Texas, to Alamo Iron Works,

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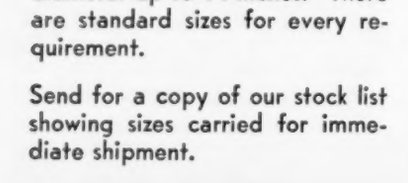

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San Antonio, Tex.; H. S. Zachary, Laredo, Tex., general contractor.

240 tons, building No. 53, veterans' hospital, Lyons, N. J., to Ceco Steel Products Co., Jersey City, N. J.; C. H. Johansen & Co., Cliffside Park, N. J., general contractor.

235 tons, barracks, Yountville, Calif., to Herrick Iron Works, Oakland.

150 tons, addition to General hospital, Bakersfield, Calif., to Kyle & Co., Fresno, Calif.

140 tons, state teachers college, Millersville, Pa., to Gilmour Steel Products, Philadelphia.

126 tons, bureau of reclamation, invitation A-22,238-A, Parco, Wyo., to Colorado Fuel & Iron Co., Pueblo, Colo.

115 tons, highway project, Red river county, Texas, to Texas Steel Co., Forth Worth, Tex.; Gaylord Construction Co., Houston, Tex., general contractor.

100 tons, library, Brooklyn, to Capitol Steel Co., New York.

100 tons, bridge, repairs, Norwich-Sprague, Conn., to Berlin Construction Co., Berlin, Conn.; Medbury & Trowbridge, Putnam, Conn., general contractors.

100 tons, Peoples store, Pullman, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

100 tons, barracks, administration and class room building, Citadel military school, Charleston, S. C., to Virginia Steel Co., Richmond, Va.; Southeastern Construction Co., Charlotte, N. C., general contractor.

100 tons, St. Phillips parochial school, San Francisco, to Gilmore Steel & Supply Co., San Francisco.

100 tons, bridges, Goose and Stoney creeks, Bedford county, Virginia, to Taylor-Davis Inc., Philadelphia; R. W. Moore, Staunton, Va., general contractor.

Reinforcing Steel Pending

1000 tons, estimated, Security prison, Mont Alto, Pa.; bids April 14.

800 tons, approach, North Bergen to Bergenline avenue, Union City, N. J., Lincoln tunnel contract MHT-72, Port of New York authority; James Mitchell & Co., Jersey City, low, bids March 29.

650 tons, buildings, state college, Pa.; bids in.

500 tons, Queens land section, East river tunnel, New York; Charles F. Vachris Inc., Brooklyn, N. Y., low.

325 tons, mesh, highway project W. P. 38-2, Wantagh parkway extension, section 3, Nassau county, New York; Serafini Construction Co., Inc., Binghamton, N. Y., general contractor, $585,555.55, bids March 29, Albany.

200 tons, high school, Muscatine, Iowa.

275 tons, mesh, highway project, Nassau county, New York; bids April 12, department of public works, highway division, Albany.

265 tons, highway projects and bridges, Connecticut; bids April 4, Hartford, including 165 tons, mostly mesh, for reinforced concrete section, 12,522 feet, Avon and Simsbury, Conn.

241 tons, mesh, highway project, Eastern state parkway extension, section 4, Dutchess county, New York; C. R. McKay, Hempstead, N. Y., contractor, $224,266, bids March 29, Albany.

240 tons, mesh, highway project, Eastern state parkway, section 3, Dutchess and Putnam counties, New York; Lane Construction Corp., Meriden, Conn., contractor, $227,514.30, bids March 29, Albany.

190 tons, junior high school, Wauwatosa, Wis.

175 tons, school science building, Springfield, Ill.

140 tons, Washington state road projects; bids at Olympia, Wash., April 12.

114 tons, pier substructures, bridge, Passaic river, Newark-Kearny, N. J.; Senior & Palmer Inc., Newark, general contractor, bids in.

Pig Iron

Pig Iron Prices, Page 84

Pittsburgh—Demand for foundry pig iron is still practically nonexistent. Orders are at about same level as the first of March, and although March tonnage showed an increase over February, there is still nothing on which to base optimistic predictions. Inventory depletion still is going on, and in view of small demand by foundries, it is doubtful if any buying of importance will develop in the near future.

Cleveland—Pig iron producers report shipments during March were 20 to 25 per cent more than in February. One seller attributes this not so much to an increase in foundry consumption as to the fact that a greater number of foundries were forced to re-enter the market last month to rebuild depleted stocks.

Chicago — March pig iron shipments were heavier than those of February, the increase for some producers being as high as 50 per cent. Gain for some sellers, however, resulted only from the three extra days last month. Consumption has been slow to increase, receiving no impetus from railroads and automotive industry. Jobbing plant schedules show occasional gains but frequently are only two to three days a week. Farm equipment castings production is well maintained. Pig iron prices for local delivery continue $24.60 in the Chicago switching area, not having been affected by recent increases in switching charges. Freight rates have been increased on shipments west of the Indiana-Illinois line but filing of tariffs on eastern deliveries has been delayed.

Boston—Still slack, pig iron buying is confined to scattered car lots to foundries. Steel works, operating at around 20 per cent for the district, are not buying. Foundry melt is low but unchanged. New freight rates to practically all consuming points in the district become effective this week. While the advances in most instances are slight, the changes will be numerous. Higher switching charges at Boston are not enough to influence the situation, being only a few cents a ton. From Buffalo the rate will be $5.40 and Eastern Pennsylvania, $4.01.

New York—Following small gain in March, pig iron demand is expected to at least hold its own if not actually make a further increase. Stocks, it is pointed out, are

slowly shrinking and it is believed this factor will exert a sustaining influence. Shrinkage in stocks is noted principally at larger consumers' plants. Small buyers, generally speaking, have little stocks on hand other than for immediate requirements. Continued hand-to-mouth buying by these interests will have a sustaining influence also.

Philadelphia—Pig iron sales and shipments in March showed mild improvement over February but consumers currently have not revised buying policies. Even larger consumers are buying no more than a car or two at a time. Usually, immediate delivery is demanded.

Buffalo—Large tonnage inquiries are lacking and shipments for March were about on par with the slow movement in February, but sharply below last year. Producers are disappointed over scarcity of buying from automotive and railroad industries. Reports indicate low inventories at foundries but no effort is made to replenish stocks.

Cincinnati — Delivered pig iron prices are being changed to conform to new freight rates. Southern iron in all grades is 17 cents higher, delivered Cincinnati. At the same point Northern No. 2 foundry and basic are 17 cents higher, taking a Birmingham base, but malleable, taking Hamilton base, is currently unchanged. At some points delivered prices are now based on Hamilton instead of Birmingham, all because of the rate increase.

St. Louis — Melt has moved up further, and in the third week of March was at the highest rate since last fall. This has been accompanied by heavier shipments, which are running sharply above the average daily rate in February. Total for March may exceed February by about 50 per cent.

Birmingham, Ala. — Production of pig iron is somewhat below accepted normal of the past few months, although the melt is not exceptionally low. Prediction is still made of an upturn at least early in the second quarter.

Toronto, Ont.—New business continues steady with sales totaling around 2000 tons weekly. In addition to a steady flow of spot orders ranging from a car to 300 tons, some larger melters have closed contracts for second quarter and others are negotiating. It is believed second quarter contracts will show some improvement over those for first three months. Operations of plants associated with steel industry are being maintained at high levels and new orders recently closed assure continuation of present rates for several months. Pig iron production is steady, with six furnaces blowing.

Scrap

Scrap Prices, Page 86

Philadelphia — Scrap quotations are largely unchanged, except chemical borings, which are nominally lower. Brokers are paying $10 a ton for yard steel for delivery at Harrisburg, Pa., against a $10.50 order. Buying prices on stove plate and breakable cast for the same point are $12.50 and $14, respectively. No. 2 steel is bringing $13 for nearby delivery, while No. 1 steel is quoted around $14.50. The Phoenixville consumer is offering $12 for No. 2 steel and $12.50 for stove plate but is not getting much at these figures, it is said. Export business is tapering and eastern consumers are expecting lower prices to result. Two boats cleared for Europe last week.

Independent dealers are reported to have taken orders for several thousand tons for Europe and are covering at $13 for No. 2 and $14 for No. 1. Although export business is less active, it appears that its influence will be felt for some time. Stocks of steelmaking grades have been depleted, not only locally but along the entire Atlantic and Gulf coasts. Another boat is scheduled to take on a cargo here April 20.

Pittsburgh — There is a definite tendency toward a weaker market here, although no sales of importance have been made for some time. Mills are still out of the market and quotations are unchanged. However, No. 1 steel has been offered to dealers in small quantities at around $13 a ton, and it is entirely possible that should there be an inquiry for small tonnages of No. 1 steel, it might go at less than currently quoted figures. This is probably due to weakness in export prices and reflects inactivity of the present local situation. Some releases on previous contracts have been received by local dealers, but no new business has been reported.

Cleveland—Iron and steel scrap shipments have dwindled to little more than a dribble. New business largely is confined to dealings between brokers and dealers, with little new scrap coming out.

Railroads have issued lists for April. The tonnages involved follow: Pennsylvania 9000 tons, of which 600 tons are heavy steel; Baltimore & Ohio 11,400 tons, of which 4500 tons are steel; New York Central 4000 tons including 1000 tons of steel; Nickel Plate 2700 tons, 400 tons steel; Pere Marquette 1600

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tons, 150 tons steel; the Ann Arbor 300 tons, and Wabash 1200 tons, 300 tons steel.

Chicago — Scrap is weaker as a consequence of continued poor demand from consumers and while prices remain largely nominal, quotations on heavy melting steel and a number of other grades are off 50 cents. Most mills give no indication of entering the market soon, some professing to be adequately supplied with old material until at least midyear.

Boston—Shippers are usually offering $12.50 to $13, dock, for No. 1 heavy melting steel for export, but in a few instances better than the higher quotation has been paid for railroad scrap. Boat loading is less active, about 7000 tons being shipped during the last week. Domestic demand is sluggish and for Eastern Pennsylvania dealers have lowered quotations slightly on several grades to offset higher freight charges. Cast grades to district foundries move in small lots and consumers are not willing to pay better than $14, delivered, for textile machinery.

New York — Reduction of $1 a ton to $11.50, barge, on No. 1 heavy melting steel for export has been made by most brokers with all expected to fall into line this week. The drop in No. 2 grade has been even sharper, $1.50 a ton to $10.00, barge. No. 2 cast has been marked down to $9.50, a decline of $1. Old compressed sheets are also off 50 cents, stoveplate for export being unchanged temporarily. No. 1 machinery and No. 2 cast for delivery to foundries in this district are also 50 cents lower. Other grades for domestic shipment are easy, but mostly nominal in view of lack of demand.

Buffalo — Further weakness enveloped the iron and steel scrap trade as the leading consumer returned to the market and purchased in excess of 6000 tons at a decline of 50 cents a ton.

The mill, after being out of the market for a month, dropped the bid on No. 1 heavy melting steel to $12.50 a ton, with a $2 differential on No. 2. The price on No. 1 bundles slipped to $11 while No. 2 bundles brought $10.

Detroit—Decreases of 25 cents to $1 again affects practically all grades of scrap, following appearance of the first of the new automotive lists this week. Continued weakness in openhearth operations adds further pressure.

While most cast grades have been holding up fairly well in face of moderate demand from foundries, a sympathetic decline in these prices also is apparent.

Cincinnati — The iron and steel scrap market is stagnant in absence of consumer demand. Outlets for moderate tonnages of clippings are still open but interest in other grades has receded. Carrying of yard stocks in anticipation of a more active market and higher prices is proving a burden to some and offerings from such sources tend to depress quotations which are, in absence of an adequate test, considered nominal.

St. Louis — The market for iron and steel scrap continues weak, with specific cuts recorded on a number of important items, including heavy melting steel.

An east side melter was reported to have purchased a round tonnage of No. 1 and No. 2 heavy melting at a figure said to be 50 cents per ton below the last previous sale of the same material. The contract specifies delivery over the next 60 days.

Birmingham, Ala. — Movement of scrap is still low, especially steel grades. Some cast scrap is moving in car lots and less, and prices are nominal with no marked tendency either way.

Toronto, Ont.—Trading in iron and steel scrap is specialized, with demand uneven. Steel mills are taking delivery of heavy melting and turnings but shipments are below those of last year, due to limited supplies available for resale and small offerings. Foundries are in the market for machinery cast and stove plate and demand exceeds supplies.

Warehouse

Warehouse Prices, Page 85

New York — Steel warehouse sales improve slowly. While slightly above previous two months, March volume was disappointing. Buying by industrial consumers is slack and spotty. Part of the gains registered by some jobbers has been due to buying by consumers with government contracts. Scattered gains in demand for sheets have been mostly for special finishes, including stainless. Sheet stocks with some jobbers are still large.

Warehouse prices have been advanced on most items, 2 cents being added on material based on Bethlehem and Coatesville, Pa., and 4 cents on steel from Pittsburgh and Buffalo. No advances are made on sheets.

Cleveland—Most warehouse distributors are disappointed at the extent of improvement in March, usually the best month of the year. Daily average shipments during the month showed only moderate increase over February and in some instances were less than 30 per cent of the same month last year. The increase in less than carload freight rates which went into effect March 28 have had little influence on sales because of its small proportions.

Philadelphia — Further moderate improvement in steel sales out of warehouse is reported. March business was ahead of both February and January but, of course, was well under March, 1937. Jobbers have advanced cold-rolled bars, strip and

wire 3 cents per hundred pounds as a reflection of the Pittsburgh-Philadelphia advance in the less carlot rate on finished steel from 38 to 41 cents per hundred. No action has been taken on hot-rolled material.

Chicago — While March sales reached the best level since November, the trend of business leveled off late in the month and April is expected to develop a sidewise movement if not smaller volume. Orders are fairly well diversified but are small individually.

Buffalo — Warehouse prices on items with Pittsburgh base were boosted three cents per hundred pounds due to increase in freight rates. Distributors reported anticipated lift was not preceded by any marked improvement in buying. Business reports vary with spasmodic betterment indicated in some instances.

Cincinnati—Minor changes upward in warehouse prices are being put into effect as freight rates change. Anticipation of these increases failed to bring out a rise in orders, needs being met on a hand-to-mouth basis.

St. Louis — Warehouse business is spotty. Building materials show slight improvement and public utilities and railroads are taking a fair volume of repair goods. Manufacturers of hand implements and certain kinds of machinery and equipment are taking a variety of items. No large orders are being placed, but current requirements call for fairly heavy tonnages of goods.

Seattle—Sales have shown steady improvement since December but business is far below March 1937, levels. Resumption of logging and saw mill operations has spurred jobbing sales but threatened idleness of Alaska salmon plants is an unfavorable factor. Federal agencies are buying in lesser volume. Price lists remain firm and are being generally observed in both Portland and Seattle territory.

Ferroalloys

Ferroalloy Prices, Page 84

New York — Changes in carlot freight rates April 11 will make the delivered price at Pittsburgh on ferromanganese $107.77, as compared with the existing price of $107.49. This is assured now that the Pennsylvania commission has approved the same changes on intrastate rates in Pennsylvania that have been announced on interstate movements.

Sellers see a little improvement ahead over the current month. March shipments were larger than those in February due in no small measure to the fact that last month was longer. The actual increase in the average daily rate of ferromanganese shipments was slight, sellers point out. As may be inferred no change is indicated in the duty paid seaboard price, which holds at $102.50.

With the placing of 11,500 tons of ferromanganese, 78 to 82 per cent, by the navy for storage at Philadelphia, the trade here is of the impression that no further action will be taken. In other words, the navy apparently will not buy the remainder of the 14,000 tons originally mentioned as maximum.

Domestic spiegeleisen, 19 to 21 per cent, is holding at $33, Palmerton, Pa., and 26 to 28 per cent at $39. Improvement in shipments has been modest, about in line with the increase in steelmaking rates.

Ferrotungsten is easier at $1.90 to $2 per pound, tungsten contained, freight allowed in carlots, compared with $1.95 to $2 recently. Most consumers have been out of the market since last November, but still have adequate stocks on hand.

Nonferrous Metals

Nonferrous Metal Prices, Page 84

New York — Nonferrous metal prices slumped sharply in London during the early part of last week but rallied on Friday. The decline was due to heavy speculative selling, uncovering stop-loss orders, which was induced mainly by weakness in Wall street. With the exception of tin primary metals held unchanged here.

Copper — Export copper dropped to around 9.45c on Thursday but closed up to 9.60c, c.i.f. Heavy purchases by foreign buyers aided in maintaining the domestic market on a steady 10-cent basis. Resale electrylytic was offered at 9.25c, delivered Connecticut. Buyers continued cautious although monthend business lifted the week's total to a fair level.

Tin — Straits spot dropped to a low of 38.00c on Thursday then advanced to 39.00c the following day on recovery in Wall street. Consumers bought actively at the lower levels. World visible supplies increased 1684 tons during March.

Lead — Consumers showed little buying interest and prices held unchanged at 4.50c, East St. Louis, 4.35c, New York. Total stocks increased about 5000 tons last month due almost entirely to the gain in refined stocks.

Steel in Europe

Foreign Steel Prices, Page 85

London—(*By Cable*)—New business in steel and iron in the markets of Great Britain is scarce except for the rearmament program of the government and considerable plant building and extensions. Stocks of pig iron and semifinished steel are increasing but some spring revival is expected to balance this condition. The sheet export trade is considerably depressed. Reimposition of full import duties on foreign iron and steel is expected soon.

From the Continent come reports of dull conditions and output is be-

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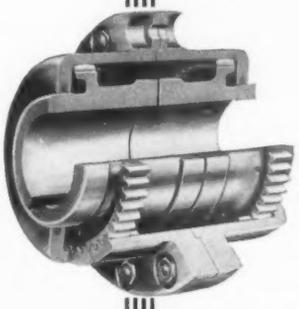

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ing restricted. A serious decrease has taken place in German exports, the February volume being materially lower. Cutting of prices is less prevalent than for some time.

Iron Ore

Iron Ore Prices, Page 86

Cleveland—Pittsburgh Steamship Co., Cleveland, which operates the ore-carrying fleet of United States Steel Corp., will start the 1938 navigation season with 40 vessels in commission. The entire fleet consists of 73 steamers and six barges. The vessels which will start the season represent approximately 60 per cent of fleet capacity. The first trip will begin about May 16.

New York—Tungsten ore is nominally lower, due to easing of war tension abroad. European prices on Chinese wolframite are now the equivalent of $22 to $22.50, duty paid and as there is no important buying of wolframite here, this spread is generally regarded as the nominal market in this country. Domestic scheelite also is nominally lower at $18 delivered consumers' plants in carlots and around $17 in less-than-carlots.

Reader Comments

(*Conclued from Page* 19)

spent in this country with, as without, the foreign trade, then surely about the same number of people must work in either case and it is folly to say that any of the money is used in supporting people in idleness. It is barely possible that more people work, at lower wages, perhaps, than would work if the pig iron had not been brought in.

The interest of the eastern producer is, of course, in how much pig iron he sells. It is possible he may sell less, due to the imports. But if foreigners buy machinery, locomotives, automobiles, and the like, it is by no means certain that this is true. The burden of proof is upon him. Our home people may take products that will absorb some of the pig iron production, using their extra money. Until we know in detail just what products have been affected by the purchases of foreigners, we cannot tell who has gained, who suffered; the community as a whole, upon which all business depends, gained.

Foreign trade is very simple. Over any reasonable period of time, the money we spend abroad is fully returned in the purchase of our goods. Our gain comes from the fact that our people are able to increase the amount of material things they can enjoy for the same amount of labor, or else we obtain goods we do not ourselves produce. Similarly the foreigner enjoys goods we produce more efficiently, or things they themselves do not have. Rapid changes in the course of trade are always painful and such changes should be dampened, but the sooner adjustments are made to continued changes in trade, the better.

In our industry we have been rather unreasonable in our objections to foreign trade. I well recall cries of woe a few years ago at the seriousness of imports and how it was ruining our industry. Unfortunately, when I investigated the figures, I found that for every dollar of steel imported, fourteen dollars worth was being exported. I think it well to face facts and adopt realistic business policies, not wishful ones.

EDWARD ADAMS RICHARDSON
1102 *Linden street,*
Bethlehem, Pa.

Equipment

Chicago — March showed a moderate gain in machinery sales compared with February. Inquiries are in fair volume but in view of tool users' tendency to restrict purchases, there is little expectation of an early, large-scale recovery. Machine tool sales usually are for individual items, the only large lists pending being those of the Milwaukee and Santa Fe railroads. Former has closed on only part of its list involving 20 tools. While small tool demand continues slow, business holds above the low point reached last December.

Seattle—Road equipment and electrical items continue in best demand although mining interests are also active. Graders, scrapers, tractors and trucks are being purchased by various Washington counties.

Boston — Deliveries on most standard types of machinery are about normal, four weeks in some instances, as domestic backlogs are about exhausted except for heavier equipment. Foreign orders, which have slowed down, partially offset the drop in domestic volume, several shops having substantial bookings for export. Some replacement business has been done by automobile plants and several eastern shops working on armament have placed a few machines, including airplane engine builders. Some orders for arsenals and other government departments are being placed, a Providence, R. I., shop booking such business rather steadily.

New York — Low production in many industries, including metalworking, has curtailed interest in new machinery, although estimating departments continue relatively active. Purchasing executives are slow to close and orders generally are limited to one or two tools. Deliveries are now near normal on most types, a few heavier lines being exceptions. The Watervliet, N. Y., arsenal recently placed five lathes with a dealer. Foreign business has partially filled gap caused by decline in domestic demand.

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Ohio

BUCYRUS, O.—City soon takes bids for activated sludge digestion plant with mechanical aeration. Cost $140,000. F. G. Browne, Marion, engineer. (Noted in STEEL, Dec. 13, 1937.)

CINCINNATI—City plans increasing pumping capacity of waterworks from 120 million gallons per day to 270 million gallons per day, including installing high service and new low service pumping facilities in new combined pumping station near filtration plant. Cost $5,948,000. Work recommended by Burns & McDonald, 307 East Fourth street, waterworks experts.

MENTOR, O.—Village soon takes bids for waterworks improvements, including two 8-inch wells, water softener and iron removal plant, two turbines, two centrifugal pumps, and 150,000-gallon elevated tank. Cost $132,000. P. Elwell, 5005 Euclid avenue, Cleveland, engineer.

PERRYSBURG, O. — Village plans waterworks improvements, including pipe, new turbine pump and motors. Cost $46,481. WPA project. C. Finkebeiner and Associates, 1025 Nicholas building, Toledo, engineers.

WRIGHT FIELD, DAYTON, O.—War department, air corps, takes bids to 10 a. m., April 8, for electric hoist with 10,000-pound capacity, delivery Wright Field; until 10 a. m., April 11, for two automatic electric bilge pumps, delivery Wright Field.

Pennsylvania

BRADFORD, PA.—Healey Petroleum Corp., W. J. Healey, president, Bradford, plans extensive development of its crude oil properties on Music mountain, McKean county. Maturity soon. Estimated cost $30,000.

HARRISBURG, PA. — General state authority, 600 North Second street, Harrisburg, receives bids until 2 p.m., April 22, for White Hill state industrial school for boys, to be located at White Hill, Cumberland county. Includes power plant, water supply system, and electrical distribution system. Cost of entire project $2,142,062. Clayton J. Lappley, architect, and Henry Hornbostel, consultant architect, Harrisburg, Pa.

JOHNSBURG, PA. — Borough council retained Perring & Remington Co., 6100 Ellsworth street, Philadelphia, to prepare plans and estimates of cost of sewage disposal plant. Cost to exceed $25,000. Project authorized by state sanitary board, Harrisburg.

PITTSBURGH—West Penn Power Co. has plans for extensions in primary and secondary lines in six counties as well as additions to rural electric system. Project includes 26 new lines, and will be carried out this spring. Permission has been secured.

Massachusetts

AMHERST, MASS.—Town, F. C. Ray, chairman, board of selectmen, is making plans for sewage treatment plant, pump house and equipment. Cost $83,000. Bonds voted for same. F. A. Barbour, 73 Tremont street, Boston, engineer.

Vermont

BURLINGTON, VT.—Green Mountain Distillery Inc., Burlington, plans improvements to its distillery. Estimated cost will exceed $40,000.

New York

BINGHAMTON, N. Y.—New York State Gas & Electric Corp. plans extensions and improvements in street lighting system in downtown and residential sections, including improved equipment.

JAMESTOWN, N. Y.—City council overrode mayor's veto to construct municipal gas plant and distribution system. Work on project will proceed at once. R. Holmes, Mt. Vernon, N. Y., consulting engineer. Estimated cost $1,200,000.

New Jersey

GLOUCESTER, N. J.—Sherwin-Williams Co., 101 Prospect avenue, Cleveland, plans installing motors and controls, conveyors, regulators, electric hoists and other equipment in new pigment extraction plant on site of old Pusey & Jones shipyard. Cost including site $500,000. (Noted in STEEL, March 28, 1938).

MIDDLESEX, N. J.—Town plans altering existing sewage treatment plant by adding two settling tanks, two digestion tanks, new final settling tank and filter. Cost $150,000. Metcalf & Eddy, 1300 Statler building, Boston, engineers.

Michigan

ADRIAN, MICH.—Southeastern Michigan Electric Co-operative Inc. is completing plans for constructing power plant substation to be erected in Adrian. Roy A. White, Grand Rapids, project engineer.

GRAND HAVEN, MICH.—Working drawings are being prepared by Pierre Lindout, architect, Grand Rapids, for constructing an addition and alterations to foundry building of Challenge Machinery Co., Grand Haven.

MUSKEGON, MICH.—Norge division, Borg-Warner Corp., 670 East Woodridge street, Detroit, plans installing motors and controls, conveyors, electric hoists and other equipment in new two-story addition to electric refrigerator and range plant at Muskegon Heights. Cost $400,000. (Noted in STEEL, March 7, 1938).

TRENTON, MICH.—Proposal to build a sewage disposal plant to serve Trenton and part of Brownstown township was approved recently by Trenton residents. Cost $150,000.

Illinois

EDINBURG, ILL.—City making preliminary plans for waterworks and distribution system. Wood, Walraven & Tilly, 322½ Sixth street, Springfield, Ill., engineers.

HOOPESTON, ILL.—City soon takes bids for constructing sewage disposal plant. Cost $60,000. Greeley & Hanson, 6 North Michigan avenue, Chicago, engineers.

MARION, ILL.—Central Illinois Public Service Co., Springfield, Ill., plans new transmission line from Marion to Goreville, where power substation and distribution system will be installed for local service.

Indiana

FT. WAYNE, IND. — Rose Plating Works Inc., Ft. Wayne, has been incorporated to engage in metal plating and finishing. Corporation has 1000 shares no par value capital stock. Lewis E. Rose, Alice B. Rollins, S. A. Bichacoff, incorporators.

FT. WAYNE, IND.—City Light & Power Works plans constructing new transformer vaults for low-voltage current, and will install automatic switch control system for three-cable distribution system. Next fall $200,000 will be spent for complete underground system.

INDIANAPOLIS—Citizens Gas & Coke Utility, 47 South Penn avenue, Indianapolis, plans improvements to its gas plant here. Estimated cost $200,000.

INDIANAPOLIS — Articles of incorporation have been filed with the Indiana secretary of state by Hoster-Hiser Inc., 3850 North Illinois street. Company was formed to manufacture automobiles and accessories and has 1000 shares no par value capital stock. George M. Hoster,

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KOKOMO, IND. — Continental Steel Corp. will construct plant addition to house new rolling mill equipment.

Alabama

GREENVILLE, ALA.—REA approved allotment of $250,000 for electrification project in Butler, Lowndes, Wilcox and Dallas counties, which will be carried out by Butler County Electric Membership Corp.

SHEFFIELD, ALA.—Electro-Metallurgical Co., 30 East Forty-second street, New York, is beginning preliminary work on new electric furnace plant near Sheffield. Company has 300 acres. Includes installing large furnace units, motors and controls, regulators, electric hoists, conveyors and other equipment, power substation and transmission lines connecting with TVA. Cost of entire project $5,000,000.

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North Carolina

KERR, N. C. — Four-County Rural Electric Membership Corp. applied loan of $186,000 to constructing generating plant at Kerr in Sampson county, and for 140 miles of line in Sampson, Pender, Duplin and Bladen counties.

STANTONSBURG, N. C.—Town plans constructing sewage treatment plant. Cost $24,000. WPA funds already allotted. G. W. Coan Jr., state administrator, Raleigh WPA.

South Carolina

GREENWOOD, S. C.—National REA has allotted $15,000 emergency fund to Greenwood county finance board for constructing line from ninety-six to power project at Buzzard roost. Will serve 60 customers and furnish power for machinery to be used in preliminary work on project.

Tennessee

CHATTANOOGA, TENN. — City Water Co. plans 18,000,000-gallon-per-day turbine-driven pump, equipped with electrical generator which will supply power for two motor-driven 22,000,000-gallon-per-day pumps, also to be purchased. Former pump for clear water, latter for raw water. Cost $150,000. T. E. Coleman, Tenth and Lindsay streets, engineer.

Louisiana

BOSSIER CITY, LA.—City has plans maturing for municipal electric power plant. Special election will be held April 5 to approve $350,000 bonds, portion of which amount is to be used for municipal natural gas system. Garrett Engineering Co., 408 Hughes street, Houston, Tex., consulting engineer.

BREAUX BRIDGE, LA. — Breaux Bridge Sugar Co-operative, R. L. Angello, president, Breaux Bridge, plans constructing sugar refinery. Estimated cost $200,000.

NAPOLEONVILLE, LA.—J. Aron & Co., 416 Poydras street, New Orleans, will probably rebuild recently burned Supreme Sugar Refinery, 7 miles south of here.

OAKDALE, LA.—Southern Bell Telephone & Telegraph Co., Atlanta, Ga. acquired site for erecting exchange on South Tenth street. Plans being prepared by company engineer.

PLAQUEMINE, LA. — City, Gladys Baist, clerk, receives bids April 12 for furnishing and installing diesel engine generating set, service pump and deep well turbine pump, crane and miscellaneous equipment.

Virginia

DORAN, VA.—W. E. Mullens Lumber Co. plans rebuilding plant damaged by fire.

HALIFAX, VA.—Town, Dr. W. S. Lovelace, mayor, receives bids March 29 for constructing complete water supply system, work separated into three divisions. Elmer E. Barnard, 407 Lynch building, Lynchburg, Va., consulting engineer.

Missouri

CHILLICOTHE, MO.—Board of public works, John R. Taylor, chairman, will take bids soon for boiler unit and accessory equipment, switchboard, instruments and other miscellaneous equipment for municipal electric power station where expansion program will be carried out. Cost $300,000. Henrici-Lowry Engineering Co., West Tenth Street building, Kansas City, Mo., consulting engineer.

KENNETT, MO.—City, Clyde Oakes, mayor receives bids April 12 for contract No. 1, diesel power plant equipment; contract No. 2, power plant building; contract No. 3, electric distribution system. Cost $170,000. Project No. 21. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., engineer.

SPRINGFIELD, MO.—Greene county court commissioners will let contract April 14 for power line serving portions of Lawrence and Dade counties.

Arkansas

HOPE, ARK.—Board of public affairs, city hall, receives bids April 6, for furnishing 450-horsepower low-heat bent-tube boiler, 200 pounds steam pressure, together with smoke stack, settings and auxiliary equipment.

Oklahoma

ENID, OKLA.—Esson Oil Co., Enid, Okla., plans rebuilding gasoline cracking plant recently damaged by fire. Estimated cost $350,000.

OKLAHOMA CITY, OKLA.—Corporation, care of G. T. Davenport, Oklahoma City, contemplates repairs and alterations to cotton oil mill here. Estimated cost over $40,000.

PENSACOLA, OKLA. — Grand river dam authority of Oklahoma receives bids about April 19 for constructing 14-mile electric transmission line to furnish power for construction work on dam. Plans and specifications on main dam, powerhouse structure, turbines, generators, gates, hoists, and appurtenances will be ready for distribution to bidders about May 1, and bids will be received about June 1. Cost of total project $20,000,000 financed by loan and grant from WPA.

Wisconsin

ANTIGO, WIS.—City will apply to WPA for funds for construction and equipment of municipal water treatment plant. Cost $100,000. Jerry Donohue, 608 North Eighth street, Sheboygan, Wis., consulting engineer.

GILLETT, WIS.—Gillet Building Supply Co. will build one-story sawmill. Plans by Geniesse & Connell, Green Bay, Wis.

OSHKOSH, WIS.—Oshkosh Brewing Co. will erect addition to bottling plant and make other improvements. Cost $50,000. C. R. Meyer Construction Co. has general contract.

Minnesota

CLARA CITY, MINN.—Village, L. J. Tammen, clerk, is taking bids to 8 p.m., April 6, for drilling a well to secure supply of not less than 200 gallons per minute, and furnishing and installing vertical turbine pump capable of 200 gallons per minute complete with electric motors, controls, main connections and incidental equipment.

EXCELSIOR, MINN.—Village, M. M. Leach, clerk, has completed plans and will take bids early in April for constructing sewage treatment plant, with digesters, clarifiers and sludge beds.

Druar & Milnowski, 830 Globe building, St. Paul, consulting engineers.

PARKERS PRAIRIE, MINN.—Village, L. A. Woell, clerk, will vote on a $12,000 bond issue to finance constructing sewage disposal plant and sanitary sewer with WPA labor. (Noted in STEEL, Jan. 31, 1938).

SHELLY, MINN.—Village, S. A. Uhler, clerk, is taking bids to 8 p.m., April 4, for furnishing electrical equipment, including transformers as per specifications on file in office of village recorder.

WAYZATA, MINN.—Village, E. L. Johnson, clerk, is preparing a report on the feasibility of constructing a sewage disposal plant. Druar & Milnowski, 830 Globe building, St. Paul, consulting engineers.

WESTBROOK, MINN.—Village, T. V. Peterson, clerk, is securing estimates on generating equipment for its light and power plant. Buell & Winter Engineering Co., 508 Insurance Exchange building, Sioux City, Iowa, consulting engineer (Noted in STEEL, March 21, 1938).

Texas

AUSTIN, TEX.—Board of directors, lower Colorado river authority, room 806. Littlefield building, receives bids April 4 for furnishing switchyard structure and electrical equipment to be installed at Marshall Ford dam.

ELECTRA, TEX.—City will receive bids April 8 for constructing municipal power plant, consisting of three 300-horsepower convertible gas or diesel engine-driven generating units, accessories, and distribution system. Funds available total $198,000. Joe Ward, Harvey-Snider building, Wichita Falls, engineer. (Noted in STEEL, March 28, 1938).

HEMPSTEAD, TEX. — City votes in April on $90,000 electric light and $60,000 water system revenue bonds.

JOAQUIN, TEX.—Portex Oil Co., Joaquin, plans constructing oil refinery and storage building. Estimated cost $90,000.

MERCEDES, TEX. — REA allotted $10,000 to Magic Valley Electric Cooperative Inc.

MINERAL WELLS, TEX.—Brazos river conservation and reclamation district, Kyle Hotel building, Temple, Tex., has plans maturing for proposed hydroelectric generating plant at Possum Kingdom dam on Brazos river near Mineral Wells. Federal power commission is determining features to be included in the plant. Federal appropriation totaling $4,500,000 has been made. Ambursen Engineering Corp., 295 Madison avenue, New York, is consulting engineer for the dam project. John A. Norris, chief engineer and general manager.

NACOGDOCHES, TEX. — Nacogdoches County Rural Electrification, Earl Reid, president, Kara L. Cooper, secretary-treasurer, plan constructing rural electric line. Have applied for REA allotment.

Kansas

LEAVENWORTH, KANS.—Board of water commissioners, E. H. Connor, chairman, is taking bids until 10 a.m., April 14, for part 1, section 1, river intake, including brick superstructure; section 2, 4,000,000-gallon-per-day filter plant; section 3, concrete roof over Pilot Knob reservoir; section 4, pipe lines and sewers; part 2, filter equipment work for four filters; part 3, section 1, pumps installed on existing foundations; section 2, electric power wiring and control equipment. Estimated cost $290,000. Black & Veatch, 4706 Broadway, Kansas City, Mo., consulting engineers.

Iowa

ALTA VISTA, IOWA—City is taking bids to 5 p.m., April 11, for constructing sewage disposal plant and laying 1700 feet 10-inch sewer pipe. Estimated cost $9000. E. E. Schenk, 200 Waterloo building, Waterloo, Iowa, consulting engineer.

NEW HAMPTON, IOWA—City has appointed Ralph W. Gearhart, Cedar Rapids, as consulting engineer for improving its power plant, including diesel engines and miscellaneous equipment. Estimated cost $100,000. (Noted in STEEL, Feb. 21, 1938).

TRIPOLI, IOWA—City is planning constructing filter in waterworks plant, subject to approval of voters.

Nebraska

HASTINGS, NEBR.—City council, Ray Crosson, city clerk, has authorized purchase of three transformers to increase carrying capacity of rural line southwest of city. Estimated cost $3000.

HASTINGS, NEBR.—Central Nebraska Power & Irrigation District, R. O. Canaday, secretary, Third street and St. Joseph avenue, is taking bids to 11 a. m., April 12, for furnishing one 25,000-horsepower vertical-shaft Francis turbine with all incidental items for Johnson No. 2 powerhouse; and one ½-twin system actuator governor for Johnson No. 2 powerhouse. Plans obtainable from secretary on returnable deposit of $25. George E. Johnson, Hastings, chief engineer and general manager.

KEARNEY, NEBR.—State board of control, H. F. Peterson, secretary, State House, Lincoln, has completed plans and will take bids soon for constructing powerhouse at state tubercular hospital at Kearney. Cost $45,000.

LINCOLN, NEBR.—State railway commission has granted permission to Lancaster County Rural Power District. O. R. Toman, chief engineer and general manager, to construct 143 miles rural transmission lines in Lancaster and Otoe counties. H. H. Henningsen Engineering Co., 326 Union State Bank building, Omaha, consulting engineer. (Noted in STEEL, Feb. 14, 1938).

STROMSBURG, NEBR.—State railway commission has granted permission to Polk County Rural Power District, Agvall S. Torrell, secretary, to construct 23 miles transmission lines to connect the district's lines with the powerhouse of the Loup River Public Power District at Columbus. H. H. Henningsen Engineering Co., 326 Union State Bank building, Omaha, consulting engineer. (Noted in STEEL, Jan. 10, 1938).

Pacific Coast

PORTLAND, OREG.—Plans for city's proposed sewage disposal system have been filed by A. C. Forester, city engineer. Cost $4,115,000.

PORTLAND, OREG.—Petrol Corp., Los Angeles, has purchased waterfront oil terminal site and proposes constructing marine oil terminal with 75,000-barrel capacity. Cost $100,000. Plans by L. A. Andrews, Portland, and Howes & Whitaker Engineering Service, Los Angeles.

SEATTLE—Terminal Oil Co., 955 Dexter Horton building, has been formed by Newell J. Banks and associates. Capital $3,000,000.

SPOKANE—Omar Hughes, architect, has been retained to prepare plans for proposed plant for Spokane Valley Canning Co. Cost $30,000.

Canada

NEW TORONTO, ONT. — Bakelite Corp., 247 Park avenue, New York, contemplates constructing factory at New Toronto. Estimated cost $100,000.

TORONTO, ONT.—National Steel Car Corp. of Montreal will construct plant at Malton, Ont., near Toronto, to manufacture airplanes. Cost $500,000.

MONTREAL, QUE.—Quebec Pulp & Paper Corp., 132 St. James street west, Montreal, is having plans prepared for modernizing its pulp mill at Chicoutimi, Que. Estimated cost $200,000.

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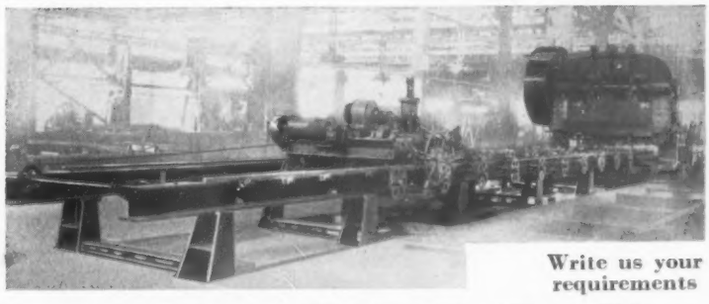
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